DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

NINETY-SEVENTH CONGRESS

SECOND SESSION

ON

S. 2248

AUTHORIZING APPROPRIATIONS FOR FISCAL YEAR 1983 FOR PROCUREMENT, FOR RESEARCH, DEVELOPMENT, TEST, AND EVALUATION, AND FOR OPERATION AND MAINTENANCE FOR THE ARMED FORCES, TO PRESCRIBE PERSONNEL STRENGTHS FOR THE ARMED FORCES AND FOR CIVILIAN PERSONNEL OF THE DEPARTMENT OF DEFENSE, AND FOR OTHER PURPOSES

PART 7—STRATEGIC AND THEATER NUCLEAR FORCES

FEBRUARY 23, 24, 26; MARCH 1, 2, 5, 8, 10, 12, 15, 16, 17, 22, 1982

Printed for the use of the Committee on Armed Services

U.S. GOVERNMENT PRINTING OFFICE
93-841 O WASHINGTON : 1982

S201-33

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

TUESDAY, FEBRUARY 23, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

HISTORICAL CONTEXT—UNITED STATES-SOVIET STRATEGIC BALANCE

The subcommittee met, at 9 a.m., in room 212, Russell Senate Office Building, Hon. John W. Warner (chairman) presiding.

Present: Senators Warner, Cohen, Jackson, Cannon, and Nunn.

Staff present: Frank J. Gaffney, Patrick L. Renehan, James C. Smith, Kathleen Troia, professional staff members; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson: Frank Krebs, assistant to Senator Cannon; Arnold Punaro, assistant to Senator Nunn; Greg Pallas, assistant to Senator Exon.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator **WARNER**. Good morning, ladies and gentlemen.

The subcommittee is pleased to begin this first hearing of the annual defense authorization cycle with somewhat of a departure from the usual practice. This departure was specifically recommended by my distinguished colleague and the ranking member of this subcommittee, Senator Jackson.

We have invited this morning three noted scholars to provide the committee with their views on the history of the relationship between the United States and the Soviet Union.

Each of these witnesses is a recognized expert and they devoted much of their professional careers to the study of the Soviet Union and to the fostering of a better understanding of the principal motivations for, and deterrents to, Soviet behavior.

I believe that it is highly important that this subcommittee, as it begins to consider extremely weighty and costly decisions related to the procurement of weapons, which are intended to deter aggession by the Soviet Union and maintain world peace, have at hand the advice and judgment of authorities such as those appearing today. I hasten to add that the purpose of this morning's hearing is not to consider specific military hardware decisions—those topics will be considered in depth in subsequent hearings; rather, it is to develop a context in which such decisions should be made.

Dr. Robert Conquest is a senior research fellow at the Hoover Institution. He has authored 11 books dealing with the Soviet Union, its history, politics, and international relations. Dr. Conquest's published works are well known to many Members of the Senate and we look forward to having him amplify upon them in his appearance today.

Dr. Uri Ra'anan is a professor of international politics and chairman of the international security studies program at the Fletcher School of Law and Diplomacy of Tufts University. He is also a fellow of the Russian Research Center at Harvard University and a member of the editorial board of the U.S. Strategic Institute's Strategic Review. He is no stranger to congressional testimony, having appeared on numerous occasions before Senate panels and the Joint Economic Committee. He has also written prolifically on Soviet decisionmaking, leadership, doctrine, and related issues.

Dr. William F. Scott brings to his appearance today a combined background as a professional military officer who has served several tours in the U.S. Embassy in Moscow and as a distinguished academician. A graduate of West Point, he is currently an adjunct professor at Georgetown University and a frequent lecturer at the U.S. war colleges. His writings include several seminal works on the U.S.S.R.'s armed forces, their employment and doctrine, some of which were coauthored by his wife, Harriet, a preeminent scholar in her own right.

Gentlemen, we welcome you and hope that, following brief introductory remarks by each of you, we will be able to engage in a stimulating and vigorous discussion of today's subject matter.

I would just add that the Congress has an enormous responsibility, particularly this year with the increased size of the defense budget, to make a very careful analysis of the threat and to try and match that to these complicated weapons systems that we have been asked by the President to authorize and fund.

I commend my distinguished colleague—we have talked about this over the course of the year—for his recommendation to open with this background because, in my own modest study of the Soviet Union in my trips there in connection with working on the "Incidents at Sea" executive agreement, I too made a lengthy study of the Soviet Union and continue to do so to this day.

It has always been my humble opinion that many of their actions find precedent in history in one way or another. Therefore, we should be ever conscious of Soviet history, past and contemporary.

Senator Jackson?

Senator JACKSON. Mr. Chairman, I am delighted to join in welcoming the three witnesses.

As my colleagues know, it is my strong conviction that we need history to guide us in national security policy, notably in the conduct of our relations with the Soviet Union. I believe it is particularly important that our Armed Services Committee, so preoccupied most of the time with programs and budgets, steps back periodically and reviews the fateful issues in historical perspective.

We are honored to have with us today three noted students of the Soviet Union. It happens that two of them are old friends of mine. I am very grateful to Robert Conquest and Uri Ra'anan for their contributions to early inquiries which we conducted in the late 1960's and the early 1970's in my Subcommittee on National Security and International Operations.

Personally, I owe Robert Conquest a great debt, starting with his definitive account of the Stalin purges in the book, "The Great Terror" which he published in 1968 and which covers the period of the terrible purges from 1937 to 1939; also for his brilliant work on the nature of the Soviet leadership; and his memorable and decisive refutation of the convergence theory in testimony before my subcommittee in 1971.

Mr. Chairman, I ask the consent of the committee to include in our record today a brief portion of the testimony of April 3, 1971. Especially in light of recent developments in Poland, this excerpt shows the profundity of Bob Conquest's understanding of Soviet reality.

[The document follows:]

EXCERPT OF TESTIMONY BY DR. ROBERT CONQUEST, FROM SUBCOMMITTEE ON NATIONAL SECURITY AND INTERNATIONAL OPERATIONS HEARING (HENRY M. JACKSON, CHAIRMAN), APRIL 30, 1971

ANALYSIS OF THE "CONVERGENCE" THEORY

Senator JACKSON. I would like to ask one last question on which to conclude.

Many people in the West are finding it hard to face up to the true facts about the Soviet leadership and the Soviet system. They seem to grasp for some happier prospect. The "convergence" theory—the theory that the Russian social and political system is gradually but inevitably becoming like those of the Western democracies—is one of their favorites. You have referred briefly to that theory. Would you analyze it for us?

Dr. CONQUEST. The "convergence" theory is largely based on the notion that all industrial societies have similar problems, and that the more or less identical economic pressures will eventually produce similar social and political structures and attitudes.

This seems to me to be, generally speaking, a reversion to a sort of economic determinist view of history. Any such view virtually ignores the preponderant weight of the whole civil and political tradition of the country. Russia's whole history and tradition is enormously different from our own, and this has now been heavily compounded by the presence there for 50 years of the even more alien and (from our point of view) determinedly aberrant Communist political culture.

This type of idea was understandable in Marx's time, when economic forces were very strong and political forces comparatively weak. But even Engels noted that "force is itself an economic power." And modern Marxists, like Dr. George Lichtheim, are perfectly clear about the often decisive power of politics over the economic and social order in more modern times.

The whole achievement of Stalin, in particular, was the creation of a political machine which could confront and master the economic forces.

I suppose Professor J. K. Galbraith is the most famous or the most articulate of the convergence theorists. He is by profession an economist. What is more, he is an economist who writes English rather than gobbledygook. But I feel it is the English of assertion and rhetoric rather than of the description of real phenomena.

I noted with interest his account of his views in the London *Times*, of the 8th of October 1969. He says, "the two systems have a broadly convergent tendency," because "both communities are subject to the common imperatives of large-scale industrial production with advanced technology"; and then in four places he tells us that we must or may assume some point about Russia. This is exactly how not to approach it. For you cannot assume a point about Russia. You have to go for the evidence.

Then in an interview in the *New York Times* (December 18, 1966), after making the same point in a general way (that the nature of technology—the nature of the large organizations that sustain technology, and the nature of the planning that technology requires—has an imperative of its own and this is causing a convergence in all industrial societies), he was asked, "Are you suggesting that as the two societies converge that the Communist society will necessarily introduce greater political and cultural freedom?"

He replied, "I am saying precisely that."

There is, of course, a trivial—almost a tautological—sense in which some of this is true. Industrial societies resemble each other in the physical, and up to a point, the organizational structure of their industry. To take it further may sound plausible, but that is simply to ignore the existence of non-economic factors, or to assume without good reason that they are simply bound to yield to the economic ones. The whole theory reminds me rather of a character in one of Peter de Vries' novels of whom it is said that he is only profound on the surface, but deep down he's superficial.

If one cannot see that organized political force has its own interests and its own powers and can guide any development in the economic side accordingly, then one hasn't seen what Russia is like.

This argument from a rather crude economic determinism would only apply, in any case, if there was an economic class with some political influence whose interests were bound up in such a change. It is sometimes argued *a priori* that the Soviet managerial class supports "reform." Like most *a priori* arguments about the Soviet Union, this turns out to be untrue when one looks at the facts. As Professor Brzezinski has lately pointed out (*Encounter,* March 1970), "the forces of reactionary resistance have included, paradoxically (and contrary to much Western speculation!), the managerial elite." The interests of this class are in fact thoroughly bound up with the present system, which may not be good for society as a whole but brings them both profit and prestige. With a few exceptions, those who have spoken up for change are from the professional and academic classes, who would not lose by it. (It is an interesting fact that *not one* of the 738 signatories of letters protesting against various trials were from the managerial group, though they included a few from engineers and technicians.)

There is one other point I think I would like to make, if I may, about Professor Galbraith's attitude to this. He implies that those who disagree with his view are, on the Western side (as he puts it), "right wing members of the military and diplomatic bureaucracy in the United States," and on the Soviet side, old line, Stalinist dogmatists, thus appearing to suggest that all decent moderates and liberals everywhere must accept his line or lose their status. But the argument is a quite false one.

For example, Professor Ota Sik, most liberal of all Communists, who masterminded the Czechoslovak economic "spring" for Dubcek, recently had an exchange with Galbraith at a conference in Switzerland. Galbraith put the view that in capitalist countries the monopolists impose prices and create fictitious necessities by brainwashing methods, and he implied that this was not the case in the East. Sik replied that in fact in the Communist countries, centralized and bureaucratized planners had become the greatest monopolists in history, while the citizen had no possibility at all of choosing his purchases or discussing the prices. He added that in Czechoslovakia, vast quantities of goods were produced which were quite useless and simply rotted; that the price indices were often falsified; that 65 percent of Czech exports were made at a loss, having been produced simply to fulfill the production plans; that most machinery—tractors, for example—weighed two or three times more than elsewhere, because the execution of the plan depended on the quantity of raw materials used and not on the quantity of machines produced. Galbraith is then quoted as declaring that he felt himself "a little more Marxist" than Sik. Sik rather heatedly retorted that Galbraith knew nothing of the Communist countries, and had little knowledge of what Marxism meant either.

But the point I am making is simply that Sik, a liberal Communist if ever there was one, holds that the notion of convergence under the Brezhnev system was nonsense. He had indeed himself sponsored a convergence, and the Russians had intervened to crush it, and would tolerate it in Russia still less. Then, on our side of the line, one could name the man I just quoted, Dr. George Lichtheim, as a Socialist (and neo-Marxist) who has written in the most contemptuous fashion about Galbraith's views.

I have discussed the idea of convergence from the Soviet side only (for in some of its forms it does also contain the implication not merely that the USSR will become—or is becoming—more "liberal," but also that the West is becoming more authoritarian and technocratic, a point with which we are not here concerned). Discussion of the relevance of the theory to Soviet conditions does take us into the essentials of Soviet reality.

It is quite true that the economic forces, like the intellectual forces, tend against the system; and that they may in the long run play their part in destroying the system. But as long as the system endures it will not "converge." Russia is now, for the third time, seeking to obtain the technological developments of the Western culture, while rejecting its whole civic and political content—as under Peter the Great and Stalin. In both those cases a merely technological "convergence" was accompanied by a social and political *divergence* into ever-greater differences from the Western methods—a tightening of serfdom and of State authoritarianism, for example.

In fine, the present Russian leadership, with its powerful machinery of enforcement, is the representative of an order of things very different from our own; and they mean to maintain that difference. They can only be understood, and Russia can only be understood, by a constant attention to the realities—and, I feel, too, a constant effort of the imagination. Anyhow, not by pretentious generalities.

Senator JACKSON. I also want to make special mention of Prof. Uri Ra'anan's early work in the examination of the political implications of growing Soviet military power. The actual deterioration in the U.S.-U.S.S.R. power balance came about rapidly, outdistancing most political commentary. Fortunately, Prof. Philip Mosely of Columbia University and Professor Ra'anan filled this gap, pioneering in the analysis of the political and diplomatic impact of Moscow's impressive gains in military power.

As we proceed today my motto, taken from Bob Conquest is, "Go for the evidence." In that spirit, I anticipate a most stimulating hearing this morning.

Thank you, Mr. Chairman.

Senator WARNER. Thank you, Senator Jackson. These distinguished gentlemen are joined by another witness who is well known by this committee, Dr. William Scott, a graduate of West Point, and he is presently an adjunct professor at Georgetown University.

We are also privileged to have with us this morning Mrs. Scott who in many respects is a partner in your endeavors to better inform the American public on this very important subject.

Senator Cannon?

Senator CANNON. I have no comments.

Senator WARNER. Senator Nunn?

Senator NUNN. Mr. Chairman, I just congratulate you and Senator Jackson, for starting off with this historical base which sometimes, I believe, is one of our principal problems here. We look at the details and never the broader picture on too many occasions. So I congratulate you. I have heard of each of the witnesses and I look forward to hearing their testimony.

Senator WARNER. Thank you very much. Dr. Conquest, we will start with your views.

STATEMENT OF DR. ROBERT CONQUEST, SENIOR RESEARCH FELLOW, HOOVER INSTITUTION, STANFORD UNIVERSITY

Dr. CONQUEST. Gentlemen, it is an honor as well as a pleasure to speak to you. The pleasure comes, as you pointed out, from finding that people as busy as you are on immediate issues do see the necessity of a historical examination; and every citizen of the West must be very heartened by this responsibiity and concern.

Though I am not a citizen of the same part of the West as yourselves, my wife is: she is a constituent of Senator Tower, which links us a little, perhaps.

The historical context within which present Soviet-American strategic relations have to be viewed is not merely a matter of the events of the past couple of decades. If we do not consider the profound roots which determine Soviet attitudes and motivations, and make them radically different from our own, we cannot understand the present situation, nor devise policies suitable to it. Indeed, I would say that most of the errors the Western Powers have made in this field over the past 30 years may be traced to ignorance of, or ignoring of, these matters.

It is natural that we are all subject to parochial misconceptions about other cultures, about the deepest motivations underlying them. Certainly I find that I myself have to make constant efforts partly of the intellect, even more of the imagination, to not read into the attitudes of the Soviet leadership the sort of thing that we would regard as commonsensical. We all tend to these unconscious assumptions.

We are inclined to see political man, as simply a sort of android robot programed with an opinion. You can argue with him, change his opinion, pull out the indoctrination and put in another one. But political man is not like that.

We rationalize political conduct by applying those criteria of reason and reasonableness seem natural to us. But political man in different systems is not the same creature holding different opinions. He is a life-form which has evolved into radically different phyla, with attitudes historically determined over long periods. Lacking to understand this, it seems to me, is one of the common faults of current political scientists. I was saying this morning: "I am not a political scientist: but then, nor is anyone else."

In the Soviet Union the present leaders are Marxist-Leninist, but that is not the point. The point is they are unable to see the world in terms other than their own. They actually see the world in a way which is quite different from ours, as if they wore different-colored glasses.

We are all the products of our historical, social and political origins and theirs can be found in the entire Russian background and in the specific Communists political and ideological present. They are the products of centuries of history, of personal and collective experience, of indoctrination, and of psychological suitability to surviving those experiences and accepting that indoctrination.

First of all, at least since the 14th century, the whole of Russian history evolved on lines very different from those of the West. Even our feudalism was a matter of rights as well as obligations. In theirs, only the rulers had rights. In the words of the great Russian historian Klyuchevsky, "The State swelled up; the people shrank."

There were other currents, as Solzhenitsyn rightly points out—there were the merchant republics of Novgorod, there was the Republic on the Waterfalls in the Ukraine—but overwhelmingly the dominant tradition was the autocracy, bureaucracy and serfdom of central Russia.

That is the heritage of which Chekhov says, "Its heavy, chilling history, savagery, bureaucracy, poverty and ignorance . . . weighs upon a Russian like a thousand-ton stone." this is written about 1900, and it has got worse, of course.

It is true that from the 1860's there was beginning of a certain Europeanization, the liberation of the serfs, a system of independent courts, and after 1905 even a rudimentary parliament with opposition members, including revolutionaries, and an opposition press. But this inchoate civic order was precisely what was destroyed by the October Revolution. Polictically speaking, that was the effect of the October Revolution.

For, against the emerging liberals and democrats and Europeanizers, the Russian revolutionary tradition was itself a despotic tradition. From the 1820's the revolutionaries spoke not of democracy or liberty, but of dictatorship to establish Utopia. Even among the revolutionary sects Lenin's Bolsheviks were noted for their extreme centralization, extreme ruthlnessness, extreme narrowness of mind. The great German Communist, Rosa Luxemburg, even before the revolution spoke of Lenin's "Tarter-Mongolian savagery."

In 1912, there were less than 10,000 Bolsheviks, and 5 years later they were in power. It was a very thin slice of the political spectrum even of politically inexperienced, or if you like, backward Russia which took power and imposed its rule by force.

Lenin's Party, was and is a millenarian sect of a type which—far from being modern by Western standards—is positively archaic, as found in the West in the 16th century and earlier. Looking at it as a phenomenon of the sort we are familiar with distorts our whole understanding of background and motivation.

Now, in the 1930's, Stalin's purges sliced this already thin slice of political Russia 10 times thinner. Any remaining signs of humanism, or of the critical faculty which was inevitably bound up with making revolution, were stamped out. Half of a party which had already been politically Stalinized was sent to the execution cellars or the labor camps.

The other major characteristic of the great purge was its falsification and secrecy, what Pasternak calls "The inhuman power of the lie." Practically nothing that was said at the time, none of the trials, none of the propaganda, had a word of truth in them. It was a fake on a gigantic scale. Among its products was the silencing, the atomizing of society. As the writer Isaac Babel—himself to perish—put it, "Today a man only talks freely with his wife—at night, with the blankets pulled over his head."

This atomization left in Russia only one effective social mechanism. The Stalin apparatus, now thoroughly cleansed of its critical element had become a complete, and even an instinctive, servant of absolute depotism.

The destruction was of that part of the party which Western attitudes had to some extent effected, and we may note that the present leadership is derived from social strata which were never influenced by the Europeanization. They were from households either of peasants or of an urban working class just out of the villages.

The membership of the present Politburo, both old and young, owe their careers to the terror. Brezhnev and Kirilenko were among the few surviving apparatchiks to fight their way out through the political slaughter-pen of the party machine in the

Ukraine. That was at a time when offical decrees denounced anybody who had not denounced others. It was no good simply being not guilty; if you did not denounce others who were also not guilty, you were arrested. A new political species was created.

The physicist, Dr. Alexander Weissberg, notes of Ukranian industry—but it applies to the whole political and social hierarchy—that during this purge, "It was only the third or fourth batch who managed to keep their seats. They had not even the normal advantages of youth in their favor, for the choosing had been a very negative one. They were men who had denounced others on innumerable occasions. They were morally and intellectually crippled."

This applies everywhere, but if we speak of Brezhnev-Kirilenko's Ukraine, they had four prime ministers in 18 months, four heads of the secret police. All the provincial secretaries were replaced several times; and all the ministers. Only 3 of over 100 members of the local central committee were left at the end of a year. This is the time when Brezhnev's career was created and he was among those few selected as suitable for the new regime.

The new institutions were based on these principles and manned by these characters. By our standards I think they would be seen as an odd selection.

Over the years they recruited like-minded younger men as their aides. Even now, of the 40-odd top leaders only 5 have not taken their first steps up the political ladder in Stalin's time, and only one of the dominating Politburo. Seven of them had actually been Stalin's personal selection for the Central Committee. Even among the Provincial Secretaries, from whom the next generation of leaders will traditionally come, two-thirds were on their way up before the old dictator's death.

I think what they learned, the attitudes which had been inculcated in them or which to a certain extent you may feel they already had the temperaments for and were selected to fit, may be defined under four headings. I am not concerned so much to give the theoretical beliefs of Marxism-Leninism so much as the ways in which it makes them act in one manner or another, the ways which are the guides to action.

First, it is a way of seeing the world which is in the strictest sense dogmatic. It accepts the idea that the final world philosophy, political philosophy and theory of society have been devised, and that the nature of the perfect human order which will prevail throughout the future is known and can be realized by theoretically prescribed methods. That is, it is a closed system of thought implying a closed society. Truth is known in contrast to falsehood that prevails in other societies. In Solzhenitsyn's words, "The primitive refusal to compromise is elevated into a theoretical principle and so regarded as the pinnacle of orthodoxy." That obviously affects our relations.

Second, this way of thinking implies that the political leadership and political considerations generally are on a higher and more comprehensive plane than all other elements in society, and the politicians make the final decision in all fields—the claim of the politician is in principle at least, total. You actually had the Central Committee issuing decrees on biological theory and that settled it for the Communist biologists, who apologized for their errors in holding different views.

Third, it is based on a theory of history and the world in general which sees struggles and clashes as the only essential mode of political or any other action. This is possibly the most important element in their attitudes, embodying Lenin's principle "Kto-Kgo—who-whom?" That is, everything is struggle in which there is a winner and a loser. Long practice in putting this into operation has made it so deeply ingrained as to be almost automatic.

Fourth, the dogma's claim is universal, applicable to the whole world. All other political orders—even communist ones which deviate in any significants way from that of the U.S.S.R. like Dubcek's Czechoslovakia or Mao's China—are in principle illegitimate and should be destroyed when tactically convenient. (It merely is not as tactically convenient to move into Peking as it is to move into Prague.) Deviant political and other views within the U.S.S.R. are similarly subject in principle to total suppression.

II. THE PRESENT SITUATION

Late in 1946, the then Secretary of State James Byrnes had to announce to a high staff meeting of the State Department that the immediate post-war policies of the United States of trying to placate the Soviet Union had proved futile, that its hostility and obduracy were inherent, and that the United States must recognize that it had a long-term adversary to cope with. Many things have changed since then, but not Soviet long-term intentions. Those who have from time to time argued that these intentions have changed have never, as far as I know, produced any evidence to support their view.

The true attitudes of the leadership may be deduced from their records and that of their party, and from everything they say or do. It has long been clear that the leaders' concern is the maintenance and extension of their system unless prevented by other methods than the extraction from them of promises on pieces of paper that they will not do so.

When I say "everything they say" makes their intentions clear, I should have restricted this to cover merely everything they say when they are talking seriously—in reports to Party Congresses, in analyses in the leading Soviet organs, and so on. When their concern is simply to disarm Western criticism, they do speak with another tongue, as when they signed the Helsinki Agreement on the free movement of people and ideas.

But just as nobody of moderate astuteness ever thought that the U.S.S.R. is run according to the liberal provisions of its very beautiful paper constitution, no one should have been so lacking in the critical faculty as to accept occasional words about friendship without taking a look at the evidence of their real attitudes.

We may assume that they do not want nuclear war, though of course there is discussion in their military press how to win one when it unfortunately comes to pass. But they have an expansionist policy built into their system.

There problem was how, in the present age, to keep expanding without much risk of nuclear exchange. In about 1965 a decision seems to have been made in the Kremlin to take on the West in armaments and on a world scale.

The expression "offensive against positions of imperialism" now began to appear regularly in the Soviet press. the first use of it seems to have been by Brezhnev in an address to the Congress of the Romanian Communist Party on July 20, 1965 when he noted that, "Some years ago" the Communist Parties had already concluded that the relation of forces had shifted in their favor and that in the meantime this had reached such a stage that the "progressive forces are not on the offensive." The call for this offensive was formalized in the Manifest of the Communist Parties in November, (*Pravda,* November 28, 1965.)

But the U.S.S.R. and the whole Soviet bloc are economically far weaker than the United States of America and the West. Moreover, the Soviet economy was also, and is permanently, years behind in its technology. On any analysis, but particularly on the Marxist one, the case was hopeless.

The Kremlin decision was for steps to be taken to ensure that the West get persuaded not to translate its economic and technological superiority into military power.

Détente is actually defined in Soviet usage as "a form of struggle" and was always envisaged in Moscow as a period in which the U.S.S.R. presented to the West a face as amiable as was compatible with continuing policy designed to undermine as it reassured. In fact, it formed the deceptive element in the tactics of such a policy.

Such reassurance included the avoidance of the more extreme acts of repression against the Soviet dissidents who—as they unanimously agree—had no defense to Western opinion. It included a certain rather superficial camouflage of Soviet expansionism, and it included negotiations for an asymmetrical reduction in those armaments in which the West had hitherto enjoyed superiority.

These measures were put through at the minimum level thought adequate to persuade the West, or a sufficiency of people and politicians in the West, that there was a serious prospect of the U.S.S.R. accepting a cooperative role in the world community. (This is a phrase which one has heard from many Westerners who have intelligence and are not lacking in knowledge of the Soviet Union, but who have not been able to make the effort of imagination to grasp the difference in Soviet motivation.)

As a result, Gromyko was able to claim as early as June 1968 in the first wave of détente that "During any acute situation however far away from our country, the Soviet Union's reaction is to be expected," and to upgrade this in 1971 at the Party Congress to, "Today there is no question of any significance which can be decided without the Soviet Union or in opposition to it."

But of course any claim by the West (in connection with Poland, for example) for a reciprocal right to be heard, is rejected as illegitimate. "Détente" was never intended as a reciprocal relationship.

The success or even partial success of these policies implied the presence in the West of politically powerful elements susceptible to deception, and ignorant of the historical imperatives which dictate Soviet policy, to put it bluntly.

A genuine relaxation of international tension would involve a genuine turn to peaceable relations by the Soviet leadership. A change on the face of it, not very likely in the foreseeable future, but at any rate only to be achieved at all by strong and realistic Western understandings and policies.

I will end on that note.

Senator **Warner**. Thank you very much. We would like each of you to express in opening remarks your views and then go to questions if that is agreeable, Senator Jackson.

Dr. Ra'anan?

STATEMENT OF DR. URI RA'ANAN, PROFESSOR, FLETCHER SCHOOL OF LAW AND DIPLOMACY, TUFTS UNIVERSITY

Dr. **Ra'anan**. At the outset I should like to express my profound appreciation of the role that has been played by the Congress through hearings such as this. As well as the contributions of the Congressional Research Service in drawing upon the resources of the wider foreign affairs and defense community, not merely here but in the West as a whole. Senator Jackson, of course, has been a pioneer in this approach area.

This morning I shall attempt to address the issue of the impact of Soviet ideology and of a developing Soviet doctrine on any analysis of the international correlation of forces.

ASYMMETRY

The absence of symmetry is the key to any realistic evaluation of the international balance between the super powers. It is essential to stress this factor, not only because of the obvious contrast between the United States and the Soviet Union with regard to geographic location and resulting force structures, but even more in view of mutual incompatibilities as far as their respective military doctrines are concerned.

Soviet ideology provides both the analytical concept and the jargon with which Soviet leaders appraise the international situation and articulate the operational conclusions that are to be drawn. As a subset of Leninist ideology, Soviet military doctrine provides the broad parameters within which the Kremlin elaborates the specifics of military science and its derivative, military art.

However, Soviet leaders do not differentiate sharply between military and civilian aspects of doctrine. Their views owe more to classical grand strategy, as is reflected in German literature than to the more narrowly circumscribed Western views of military doctrine.

The fact is that in Soviet thought, war and peace are not mutually exclusive—as they might be perceived by Western minds. Lenin viewed conflict as the norm of social and political organisms no less than of nature itself. In that context, war and peace constitute no more than hashmarks between which the course of permanent conflict meanders.

STALIN AND AFTER

Paradoxically, the eventual inevitability of global confrontation in its most violent form as an appropriate way of resolving the inherent tension between two social systems was posited more stark-ly before Stalin and since his demise than it was during some periods in the reign of that grim personality.

The irony of history is that a far more light-headed, less cautious and responsible, adventuristic attitude on this vital issue came to be characteristic of the subsequent so-called good days, namely the age dominated by Krushchev and his successors.

It was not the tensions and fears of the cold war, but rather the more buoyant atmosphere of peaceful coexistence and détênte that witnessed the predominance of a Soviet doctrine favoring war-waging and war-winning scenarios rather than deterrace and war avoidance.

The explanation is quite simple: Weakness and fear in the face of American nuclear preponderance motivated Stalin, while subsequent generations of Soviet leaders have become rather dizzy with success in the thermonuclear field.

IDEOLOGICAL STRUGGLE

To be sure, when dealing with conflict in the current international arena, Soviet literature places emphasis on "ideological struggle."

However, Russian publications leave very little doubt that this term is not intended to confine confrontation to the etherial realm of the contest of ideas: Rather, it turns out that such struggle encompasses a veritable gamut of means—conventional and unconventional, overt and covert—through which one system is to attain irreversible hegemony over its adversary, if not eliminating the latter entirely.

Thus, Soviet statements emphasize that the U.S.S.R. will not allow its opponents to implement even primarily defensive counter measures—which the Soviet Union subsumes conveniently under the heading of "export of counterrevolution." Judging from the examples that are provided, this category covers Western efforts to ward off the overthrow or defeat of friendly governments.

Consequently, the status quo is accepted as viable only with regard to the possessions of one of the parties, but remains entirely fluid where the territories and spheres of its adversary are concerned.

To date, this so-called "ideological struggle against export of counterrevolution" has embraced:

(1) Soviet organization, training, arming, and logistical infrastructure for surrogate forces operating in remote regions and including Cubans, East Germans, and others.

(2) Similar support for the expanding Terrorist International—leaving in abeyance for the moment the question whether or not this implies complete Soviet control.

(3) The increasingly direct intervention of Soviet Armed Forces, such as in Afghanistan.

In very few, if any, of these instances has the role of the U.S.S.R. been merely reactive—that is to say, it has not been compelled to respond to any military initiatives by the adversary which might jeopardize the territorial integrity of the Soviet Union itself: Rather, these have been cases either of Soviet offensives resulting from opportunism, particularly in the Third World, or of Soviet attempts to resolve primarily political problems that have threatened (that is, questioned) the entrenched power monopoly of a Communist Party and/or of a pro-Soviet regime.

Surely, a domestic challenge to Communist prestige or legitimacy is not equivalent to an external military threat or intervention.

INITIATIVE AND DECEPTION

The Soviet Union's rejection of the role of a mere reactor reflects an essential ingredient of Soviet doctrine, namely that it is imperative to seize and to maintain the initiative in military and political arenas alike.

This element is linked integrally to two other components of the doctrine, specifically the penchants for the offensive and for surprise and deception.

It is hardly necessary to define the role these factors can assume in a thermonuclear age; viewed strategically, the offensive wedded to surprise and deception could be translated into first strike without undue effort of the imagination.

It should not be deduced from these propositions, however that the Soviet leadership necessarily is committed to short-war scenarios. To be sure, Soviet literature stresses that the side enjoying the initiative and resorting to the offensive with maximal exploitation of surprise and deception may be able to achieve major, probably decisive, advantages at the initial stages of a global confrontation.

This does not mean, however, that under all circumstances conflict termination will be achieved rapidly. On the contrary, the Soviet leadership remains convinced of the (typically continental) view that final victory requires seizure and occupation of enemy soil.

MOBILIZATION AND RESERVES

Consequently, such factors as surge mobilization—economic, technological, and in terms of manpower—continue to be essential components of Soviet military doctrine which anticipates the possibility of a prolonged interval between the initial surprise—however traumatic, may be the blow inflicted on the other side—and war termination. The latter includes not only the eviction of the opponent from the territories of his friends and allies and their occupation by the Red Army, but the collapse of his system and his eventual surrender.

These aspects, reminiscent of more conventional warfare scenarios, assume protracted conflict to be probable and call for the necessary preparations, irrespective of the unprecedented and, probably, esoteric dimensions of such a conflagration that is likely to spill over into outer space as a zone of combat.

In this context, a decisive role is assigned to the reserves. This applies especially to the strategic nuclear forces, the leaders of which imbued still with the traditions of the Russian artillery that dominated their early training think and plan in terms of repeated salvoes with victory rewarding the side that retains sufficient reserves for a potential last salvo when the opponent has exhausted his supply of warheads. The other branches of the Soviet armed services tend to share these views.

Indeed, Soviet force posture—on Warsaw Pact territory along the frontiers of the U.S.S.R, and in the Soviet military districts—is based on the rapid mobilization of reserves to flush out the permanent skeletal infrastructure of additional military units established in accordance with the Soviet traditional three echelons of preparedness that range from combat-ready to easily mobilizable entities.

THE HERITAGE OF CLAUSEWITZ

Certain general principles continue to dominate Soviet military concepts, technological changes notwithstanding. Lenin agreed fundamentally with the Clausewiczian proposition that warfare essentially is an extension of politics. The concept that war qualitatively is not to be viewed as on a plane higher than related forms of political, diplomatic, civil, economic, or social conflict, has been expressed in Soviet literature ever since Lenin's day.

In this particular respect, the thermonuclear age has failed to bring about a basic revision. Nor has there been a tendency to review the tenet that conflict is endemic, that it will continue from time to time to take the form of international warfare, and that there are no compromises—only the victors and the defeated.

In other words, the Soviet Union subscribes to a dynamic, not a static view of history. For that matter, the literature continues to posit that ideological struggle is bound to end in the annihilation of one system by the other as a result not merely of verbal, but of extremely physical conflicts.

It is true that some of the more specific components of Soviet military doctrine as opposed to these broader concepts have undergone modification and revision. Nevertheless, in traditional Russian fashion, current Soviet leaders like Stalin before them, still are enamoured of sheer size and numbers, quite apart from quality, believing that more is better.

KHRUSHCHEV AND AFTER

In 1960, Khrushchev enunciated a new doctine based on the assumption that strategic blows would precede an offensive by theater forces, unlike earlier periods of history. In other words, in response to the exigencies of the thermonuclear age, a reorientation took place paying primary attention to surprise attack by means of nuclear missiles that would cause the adversary's interior to suffer prior to his front lines.

In this context, heavier initial emphasis was to be placed on firepower than on mobilized manpower. However, following Khrushchev's ouster, one major modification was made toward the end of the 1960's, rehabilitating the role of theater forces that had been downgraded by Khrushchev in part because of demographic exigencies, as opposed to the newly established Strategic Rocket Forces.

Since then upgrading of the significance of ground, air, and naval forces has continued unabated, accompanied during the 1970's by increased emphasis on the projection of Soviet military power into remote corners of the globe, a role that has been stressed particularly—but not exclusively—by the leaders of the Soviet Navy.

SHORT AND LONG WARS

Because of the modifications of the late 1960's and the 1970's, short-war scenarios which seemed fashionable for a brief period previously have been revised—as I pointed out.

Incidentally, the publications of Soviet military theoreticians and planners stress the need for paralyzing the adversary's C^3 system in the opening stage—obviously not sharing the preoccupation of Western analysts with the thought that functioning C^3 systems would be required to enable both sides to negotiate a halt in an escalatory process.

In the context of war survival and recovery to which Soviet mobilization scenarios pay appropriate attention, a particular important role is assigned to active and passive defense represented by the Anti-Air and Anti-missile, and the Civil Defense Commands. This posture makes much more sense on the assumption that active and passive defense will need to deal only with American residual strategic forces following a Soviet first strike, and that the U.S.S.R. will abrogate the ABM Agreement in accordance with its provisions.

THE SHADOW OF POWER

Soviet military doctrine, as one might expect, does not neglect the possibility that the long shadow of military power may prove sufficiently potent for the purpose of achieving political hegemony precisely because Soviet war-fighting scenarios seem increasingly credible. Consequently, actual resort to military might—at least as far as its most devastating strategic manifestation is concerned—may not prove necessary.

It is in this sense that one should perhaps interpret the remaining echoes of Khrushchev's contribution to the issue of the inevitability of war which he questioned. If the threat of force will suffice, then indeed use of force may not be essential.

Nevertheless, the Soviet literature of recent years is replete with war-fighting assumptions with very few caveats, apparently as the most realistic point of departure for the tasks that Soviet planners and decisionmakers have to implement Western war avoidance theories, on the other hand, are mentioned usually with contempt.

JUST AND UNJUST WARS

The Soviet leadership, obviously, does not feel that it is feasible to eschew war altogether as an instrument of policy. A major doctrinal reason is that Moscow continues to posit a sharp distinction between just wars and unjust wars, and in this context goes on to denounce sharply Western pacifists who oppose all wars irrespective of their class context.

Soviet doctrine maintains flatly that wars waged by socialist countries against imperialists, by their very nature are just with regard to the former and unjust as far as the latter are concerned, irrespective of how the conflict originated and who was the initiator.

The same concept applies to wars of national liberation and to civil wars between the bourgeoisie and the prolitariat. Since at least the latter two cases are regarded as endemic because of the dynamic assumption of historical and dialectical materialism and because in these instances, the export of counterrevolution by the imperalists is taken for granted, high probability of a U.S.-Soviet military confrontation is implicit.

Moreover, Soviet doctrine assumes that military conflict between the superpowers, regardless of how and where it started, most probably will escalate to the nuclear level, so that the respective strategic nuclear forces may be expected to come into play.

There are some exceptions to this proposition but they refer mainly to wars between bourgeois states and to such local wars as may be considered marginal by the superpowers so that they can be contained.

Even the latter case is not free of Soviet caveats, however, since the concept of wars of national liberation applies not merely to guerrilla actions against established but even to military operations between governments, sovereign states whenever the U.S.S.R. sees fit to promote one of them to honorary membership in the National Liberation Movement.

Observers may note, of course, that Soviet literature fails to address another obvious contingency, and that is wars between socialist states themselves.

CIVILIAN AND MILITARY VIEWS

This intensely political approach to the question of war explains, at least in part, why distinctions between the military and the civilian aspects of Soviet doctrine are arbitrary and misleading, since one is dealing with a highly integrated theory encompassing both elements. It is equally artificial to reduce the analysis of the Soviet decisionmaking process to some imaginary tug of war between civilian doves and military hawks, with the latter lobbying for increased appropriations.

This paradigm reflects mirror imaging at its most simplistic level. Although military figures in the Soviet Union frequently write about individual aspects of current military doctrine, there are few if any examples that demonstrate their ability to shape or modify overall doctrine. On the contrary, as in other case linking doctrinal and operational issues, it is the leadership of the Communist Party of the Soviet Union that enjoys an unchallenged monopoly over decisonmaking.

The Man on the white horse continues to be a specter haunting the CPSU leaders and appropriate measures are in force to exorcize this phenomenon.

SOVIET DEFENSE LITERATURE

It is misleading to view the international affairs and defense literature of the U.S.S.R. as purely propagandistic or for internal consumption only (!)—whatever that may mean—or, for that matter, as mere deception. To be sure, there are specifics to which the open literature alludes but which are discussed more overtly and concretely in the restricted or classified organs, which Western analysts have been able to obtain in some instances.

However, few serious observers of the Soviet scene will challenge the view that the Kremlin leadership spends an inordinate amount of time and energy discussing, drafting, and vetting doctrinal statements, even in the open publications, because they serve to guide Soviet cadres of the middle and lower middle level who are meant to draw operational conclusions.

The objection is voiced frequently that Moscow must be concerned lest valuable information be given away in this manner to the West; however, I believe this argument lacks validity.

Over the decades—one hopes this does not sound too bitter—the Soviet leadership has learned that relatively few Western analysts attempt to decipher such literature, that the conclusions of these analysts do not appear to have much impact on Western decisionmakers and policies, while, in any case, Western institutional memories are notoriously short.

SOVIET AND WESTERN APPROACHES

To return to the assymetry mentioned at the outset—or, perhaps it would be more accurate to refer to two assymetries.

One refers to the lack of relationship between Soviet reality and the way in which it is perceived by many Westerners. The other assymetry relates to the West's own doctrines. The U.S.S.R., perhaps unlike ourselves, develops capabilities to reflect the requirements of doctrine rather than the other way around.

Analysts of Soviet military affairs have noted cases in which doctrinal revisions anticipated by a number of years the existence of new capabilities that became visible only at a subsequent stage.

Soviet doctrine from time to time calls for the enhancement of capabilities in certain areas and is articulated in modified form as soon as Soviet science and technology indicate the feasibility of developing the appropriate hardware.

As for the other problem: Mirror imaging appears to be a professional hazard of Western analysis of unfamiliar environments. It is amazing with what ease Western thinkers assign to the Soviet scene the concept—accurate or not—that they apply to their study of bureaucratic and legislative processes in Western capitals. Consequently, terms like "military-industrial complex," "lobbying for appropriations," "inter-service rivalries," and so on abound in Western publications concerning the U.S.S.R.

Many here in the West appear reluctant to ask the appropriate question, namely, do their descriptions bear much resemblance to the manner in which the Soviet decisionmaking system actually functions?

Equally surprising is the rather lighthearted vein in which certain artifacts of Western military thought are ascribed also to Soviet theoreticians—irrespective of whether Soviet literature, the Soviet posture, or Soviet capabilities and operations, bear out these assumptions to any meaningful extent. "Mutual assured destruction," "mutual war deterrence," defense is destabilizing in the strategic nuclear arena, and similar gems readily come to mind.

The creators and supporters of these concepts in many instances undoubtedly were motivated by sincere hopes and expectations. Regrettably, "Wishing Will Make It So" is not necessarily applicable to this case.

Perhaps the most remarkable aspect of this syndrome is the fact that Soviet defense literature not only implicitly but on many occasions explicitly has rejected these Western constructs and the accompanying terminology as bourgeois, reactionary, and unrealistic.

At least as far as the last of these adjectives is concerned, one finds it somewhat difficult to disagree.

Not only is it unreasonable, therefore, to conclude that the U.S.S.R. subscribes to accept what it so clearly rejects, but the very approach inherent in Western concept is incompatible with the ideological foundations on which Soviet doctrine rests.

Thank you very much.

Senator WARNER. Thank you very much. Dr. Scott?

STATEMENT OF DR. WILLIAM F. SCOTT, ADJUNCT PROFESSOR, GEORGETOWN UNIVERSITY

Dr. SCOTT. Thank you very much, Mr. Chairman and members of the Armed Services Committee.

Dr. Conquest has given an overall historical view of the Soviet view of military power. Dr. Ra'anan has discussed in general terms the role of military doctrine within the military structure itself and the Soviet leadership.

I would like to be more specific and discuss the continuity of Soviet military doctrine as it has developed over the past quarter of a century.

It was in the late 1950's that the Soviets possessed both nuclear and thermonuclear weapons. In 1957, they fired the world's first intercontinental ballistic missile. As a result of these successes, the Soviet military were directed by the party leadership to determine what impact the nuclear weapon and the missile would have upon military power.

The conclusion reached was that the nuclear rocket weapon would be the decisive factor in any future conflict.

For the future, Soviet spokesmen explained, the military might of a nation will be dependent upon the quality and quantity of its nuclear weapons and the means of their delivery.

This conclusion led to a new military doctrine, the basis of which was outlined by Nikita Khrushchev on January 14, 1960. Marshal Malinovskiy, then Minister of Defense, discussed the doctrine in detail in his address to the Party Congress in 1961.

Military doctrine, according to Soviet definition, is the military policy of the Communist Party. It determines the probable enemy, the nature of the war to be fought, its goals, and the methods to be used.

Marshal Sokolovskiy's famed book, "Military Strategy," was the military implementation of the new doctrine. This appeared in the summer of 1962, before the Cuban missile crisis. I arrived in Moscow to begin a tour as the senior air attaché in late August. One of my first tasks when I was in Moscow, was to send copies of Sokolovskiy's Military Strategy out to Washington and request that it be translated as quickly as possible. However, the Cuban missile crisis came before the book was fully analyzed.

A second edition was issued in 1963, following the Nuclear Test Ban Agreement. We picked up a copy about 4 o'clock one afternoon and my wife Harriet stayed up until 2 o'clock in the morning to make a detailed analysis of the first and second editions.

We found that neither the Nuclear Test Ban Agreement nor the Cuban crisis had any impact upon Soviet military concepts.

Now, in late 1964 there was a widespread feeling in Washington that the ouster of Khrushchev would decrease the Soviet emphasis on nuclear weapons. Brezhnev was supposed to a very reasonable person. As some of you may recall, the statement was made in Washington by a very senior official in the Department of Defense in 1965 that the Soviet Union had no intention of challenging the United States' superiority in nuclear weaponry.

For those who read Soviet military publications it was apparent that the Soviet nuclear drive was being maintained. To emphasize the significance of the weapon Soviet spokesmen, from Marshal Malinovskiy on down, told how the nuclear weapon and the missile had brought about a revolution in military affairs. A previous such revolution had existed hundreds of years earlier when gunpowder replaced the cold weapons—the pike, the sword, and the spear.

This revolution had brought about the downfall of feudalism. The new revolution in military affairs, brought about by nuclear weapons, would bring about the downfall of capitalism.

The revolution in military affairs was explained throughout the 1960's in hundreds of books and in thousands of journals and newspaper articles. In December 1964, right after the ouster of Khrushchev, a new "Officer's Library" series of books was announced. This would be for the self study of officers and would show further the significance of the revolution.

The third edition of Marshal Sokolovskiy's Military Strategy, which appeared in 1968, was one of the books in this "Officer's Library" series. This showed that Brezhnev's first 4 years in power had followed the military tenets expressed by Khrushchev in 1960.

Incidentally, again my wife translated this book, did an analysis and commentary, but was unable to find a commercial publisher for the book until 1976. As Dr. Ra'anan mentioned, it was a long, long time before any attention was given to Soviet military writings.

Now, the final book in the "Officer's Library" appeared in 1973 after the signing of SALT I. Its title, appropriately, was "Scientific-Technical Progress and the Revolution in Military Affairs." After the signing of SALT I in Moscow—and I was there for a second tour at the time—we eagerly searched Soviet military bookstores and read the journals as they came out to see if SALT I had brought about any changes in Soviet military thought.

We found that there had been following the Cuban crisis or the ouster of Nikita Khrushchev. Soviet writing still asserted that "Soviet military doctrine requires that the armed forces, the country, the whole Soviet people, be prepared for the eventuality of a nuclear war."

There have been two modifications to Soviet military doctrine since Khrushchev's original announcement. Dr. Ra'anan has touched upon them, I would like to go into a bit more detail.

The first modification was in the late 1960's when Soviet teachings specified, "Military units and subunits must be prepared to fight with or without the use of the nuclear weapon."

Until that time, Soviet strategists had declared that any future conflict between nuclear power would begin with massive nuclear exchange. Following NATO's adoption of the flexibile response concept and the buildup of Soviet ground forces, doctrine was modified to permit the possibility of a non-nuclear phase in any future conflict.

The second doctrinal modification, announced in 1974 by Marshal Grechko, asserted that the Soviet Armed Forces were no longer restricted to their traditional function of defending the Soviet Union and other socialist states. Henceforth, the Soviet Union would support national liberation struggles and prevent the export of what the Soviets call "counter revolution" as Dr. Ra'anan has discussed. Soviet writings since 1974 have emphasized the external" role of the Soviet armed forces.

Now, first, doctrine and the modification have certain objectives. The objective of the doctrine announced by Khrushchev in 1960 was to neutralize the strategic nuclear power of the United States. Once the Soviet strategic buildup was well along in the late 1960's, the second objective was emphasized, to increase theater forces capable of fighting with or without nuclear weapons.

When theater forces reached a certain level, opposing both NATO and China, the third objective was stressed—the use of Soviet Military forces in any region of the world, or the power projection phase. It is this power projection phase which the Soviet are now in, and which has the United States so concerned.

This does not mean that there has been any decrease in the importance the Soviets attach to nuclear forces or to theater forces. Without strategic nuclear forces superior to or at parity with those of the United States, and theater forces superior to those of NATO, Soviet power projection capabilities would be of little consequence.

Since 1978, those few selected Soviets who are permitted to meet with foreigners, and even travel abroad, have asserted that Soviet military doctrine and strategy have changed. A close examination of Soviet publications, from books issued for premilitary training of Soviet youth to textbooks for higher military schools, do not bear this out.

I might mention that in our home we have now over 8,000 Soviet military books and pamphlets on military affairs in the original Russian, and we subscribe to some 23 Soviet journals and newspapers. Our stacks go back to the early 1960's and we follow this very, very carefully.

We did find that a December, 1979 publication carried a 9-page entry by Marshal Ogarkov, Chief of the General Staff, on military strategy. Ogarkov's statements, although worded more cautiously than those of Soviet spokesmen in the 1960's, reaffirmed the role of nuclear weapons, the requirement to prepare for a protracted war and that, with proper preparations beforehand, victory in a nuclear conflict can be achieved.

Since that time, other Soviet spokesmen have shown the same continuity of doctrinal and strategic concepts. At times, their rationale seems somewhat strange. As one Soviet general stated in a leading Party journal in 1980. "In imperialism's hand, nuclear missile weapons are terrible weapons of war. In the hands of socialist states, nuclear weapons are a shield for peace. They have been created to curb an aggressor and avert war."

Although basic doctrinal concepts show continuity, significant changes are taking place today in the organization of the Soviet armed forces, the greatest change since the 1960's.

Within the past 2 years, the Soviet air defense structure has been radically changed. This might be due in part to new technologies and new weapons systems such as the introduction of the combat helicopter and the anticipated deployment of cruise missiles by NATO.

A force called "Troops of the Far East" has been established with headquarters in China. This is the first identified organization of this type since 1953. This is either a declared theater of military operations or a TVD, or possibly a strategic sector. Changes are taking place in Soviet long-range aviation, the details of which are unknown at present. the number of tanks and motorized rifle divisions have been significantly increased. There have been many changes to improve the Soviet command and control structure.

We read today statements by Marshal Brezhnev, commander-in-chief of the Soviet Armed Forces and chairman of the Council of Defense, in which he claims that a nuclear war would bring an end to civilization.

This has been a theme since 1977. In the past few months it has been taken up by other members of the Politburo as well as by senior military personnel.

We would like, of course, to believe that Marshal Brezhnev means that serious negotiations might possibly take place. However, the theme is not new. In the late 1950's and up through the mid-1960's, Khrushchev and his marshals also said that a future war would turn entire continents to ashes. This theme was maintained up until about 1966.

This had been at a time when Khrushchev was in the process of deploying the world's largest nuclear-armed ballistic missiles force, and deploying missiles to Cuba.

The "destruction of civilization" theme was muted somewhat between 1966 and the mid-1970's but now has picked up again.

Today, as in the 1960's, the words of the Soviet leadership about the destruction that a possible future war would cause appear directed primarily for foreign consumption. The 1981 textbook, "Beginning Military Training"—issued in over 1-million copies each year—treats matter-of-factly the use of nuclear weapons on the battlefield. The same attention to battlefield nuclear tactics is found in current writings in Soviet military journals and newspapers.

Now, as in the early 1960's, Soviet writers on tactics specify how the nuclear weapon will be used in advance of troops and how tanks will be sent in to exploit the nuclear strike.

In summary, the Soviet leadership has reason to be pleased with the military doctrine and strategy formulated in the late 1950's and explained in the 1960's. These concepts gave direction to their military buildup. In slightly over a decade from the time the policy was announced, by 1972, the world realized that the Soviet Union had reached the position of a military superpower.

Thank you.

Senator WARNER. Thank you very much.

Before we entertain questions—and we will follow the 10-minute rule—I would like to invite Senator Cohen if he wishes to make any opening statement.

Senator COHEN. No, thank you, Mr. Chairman.

Senator WARNER. I will address a question and I will ask each of the members of the panel to provide whatever insight they may wish.

That is on the subject of Soviet succession of leadership. In your judgment, in the coming few years, what are the probabilities of a change of leadership, what type of leadership might we expect, and what might that leadership do with reference to any revision in Soviet military doctrine.

We will start with Dr. Conquest.

Dr. CONQUEST. In the course of nature one assumes that the present aging leadership must go, though you must remember from the example of China that in every Communist country there is an older generation knocking at the door. Nevertheless, of course they eventually will disappear.

I think the first thing to say is that the first generation of successors—whoever they may be—the people now in their early sixties, are of the same class and virtually the same background as the current leaders. So, here no change can be expected of any sort one way or the other.

Of the next generation, the people who are now in their late forties, every type of dissident literature from the Leninist Roy Medvedev to the liberal Academican Sakharov and those further on the right, are all agreed that these younger apparatschiks are not keen ideologists. Marxism is dead in their minds. Now this, it is argued, may produce a change.

But as I was trying to stress earlier it is not a question of belief. They are brought up with the same habits, they have fought their way up not on Marxist theory perhaps, but on the principle of "Kto-kgo" "who-whom." They are wholly the products of the Stalinist tradition in their actions and attitudes.

Sakharov and Ginzberg and the other dissidents figure these new men might actually be worse foreign policy, that this dying out of the mere metaphysical belief will not make any difference to their actions, just as a younger member of the Mafia may not believe in omertà any more, but is no less a danger for that.

So, until some very great change takes place I would not think that any serious improvement is likely to come from the new men.

Now, the only other point is, a political crisis could conceivably arise in this extraordinarily centralized system—which might shake it very badly if prolonged political infighting took place—for obvious reasons.

Senator WARNER. Of course, that goes back to your observation that some 10,000—I think your statement was—in 1912 or some period in there, soon swelled to millions and then eventually took over the government.

Do you foresee any possibility along that line in the near future? In other words, some manifestation of the needs of social improvement, better quality of life for the citizenry could take hold and check the political system?

Dr. **Conquest**. I think certainly not in the near future. I think I agree with your implied suggestion that there are pressures for change and in generations they might take some sort of effect. But the whole political system designed by Lenin and even more by Stalin is designed precisely to suppress and cope with any pressures for change.

I would not be optimistic about the immediate future. As to the long term—it took 50 years for the changes from 1860 to, say, 1912, and they were not adequate even then. Still, there is a possible optimistic perspective over a long term if we keep our heads, and if they do not launch into any military adventures or destroy their own country.

But I think it is also true to say that none of us know what can happen in the Soviet Union. As I said, I do not foresee any essential change in the ideas of the political leadership. I find it hard, too, to envisage the fall of the political leadership. But I do not think we should absolutely exclude the possibility of some very startling breakup of the whole system.

Senator **Warner**. Thank you. Dr. Ra'anan?

Dr. **Ra'anan**. Basically I agree with my friend and colleague, Bob Conquest—not for the first and not for the last time.

There has been always an almost millenial tendency in Western diplomatic circles to expect that a newer generation of Soviet leaders would initiate fundamental improvements. This belief was articulated most notably in the period in which publications appeared on convergence between our two societies; where, the assumption was that, if you please, young technocrats would take over on both sides and would resemble each other to such an extent that it would become difficult to tell them apart. Several works along these lines readily come to mind.

Yet, convergence apparently has not taken place. It has not happened because, in the U.S.S.R., the pure technocrat, as opposed to the bureaucrat who has had some technical background, does not seem to becoming more prominent among the top decisionmaking echelons.

Now, it is perfectly true that, in one sense, the younger generation—in the U.S.S.R., this means persons in their fifties—is not composed of ideologues, but, precisely in the same sense the present ruling generation is not wholeheartedly ideological either. By which I mean that there is no one in the current Soviet leadership—not to speak of the Soviet people—who is willing to make serious sacrifices "for the sake of world revolution." The Kremlin does not really pose a revolutionary threat. The U.S.S.R. today is one of the most reactionary societies the world has experienced, retrogressive rather than conservative. The Soviet threat is military in nature, rather than revolutionary, Russian covert operations notwithstanding.

However, the Soviet leadership does conform to patterns of thought and of analysis fashioned by residual aspects of Leninism still haunting the Kremlin; among these, the dialectic is the most important, that is the proposition that conflict is endemic; that in struggle conflict there are no compromises, there are only the victors and the defeated.

I am not so sure that everyone in the West would disagree with the accuracy, however regrettable, of such an analysis of the nature of contemporary international relations. A belief in the dialectic is shared by the older and the younger Soviet generations alike and the obvious operational expression of that belief is military force.

However, one should not dismiss entirely the impact of constant immersion in turgid ideological jargon. One of my former students conversed with young Soviet technicians working in West Africa. Having researched the question how Soviet ideology views the Third World, he asked these Soviet emissaries "What do you mean by terms like 'national democracy,' 'revolutionary democracy,' the 'non-capitalist path of development'?"

The immediate answer was, "Oh, that is a lot of ideological claptrap."

Five minutes later, however, the very same persons, while analyzing the situation in the West African country concerned resorted to the identical terminology that they had just denounced as "ideological clap-trap." The jargon has influenced thought to the point where thought cannot express itself except through the jargon.

In that sense also there is no significant gap between the younger and the older Soviet generations.

Now, Bob Conquest has mentioned correctly that there is always the possibility of a fundamental rupture in the system, resulting from a succession struggle that would exacerbate existing Soviet vulnerabilities—and the fact is that the U.S.S.R. rests upon a very vulnerable system.

We should remember, although very few observers at the time paid adequate attention that in 1953 and 1954, soon after Stalin's death, the Soviet empire nearly disintegrated—not only because of the uprising in East Germany, but also the revolt of the Gulag prisoners with the NKVD guards going down on their knees to beg forgiveness of their victims, and throwing away their weapons. Such disintegration always remains a possibility in the Soviet case.

However, I am not sure that I would console myself unduly with the thought of Soviet vulnerabilities. For one, we in the West never have developed a strategy that would take advantage of such opportunities. We did not know how to do it in 1953–54; I see no sign that anyone is prepared for such an eventuality today.

Dr. SCOTT. Looking more specifically at military leadership. There seems to be quite a break in outlook between the Soviet military leaders who held high positions during World War II and those of the present time.

For example, in the early 1960's Marshal Malinovskiy, Marshal Grechko, Marshal Sudets, head of air defense, Marshal Vershinin, head of the air forces, these men were fairly easy to talk to at receptions. We would normally have a drink with at least two or three of these men, especially the marshals of aviation since I was a pilot myself, and a few brief conversations about World War II.

Their leading ace or No. 2 ace—I forget which—had even fought and achieved most of his victories in the old P-39, an airplane that I hope none of you remember here.

Then, by the 1970's the situations had changed. There was no friendliness, there was no rapport at all with any of the Soviet military. I once complained to Marshal Kutakhov, the commander-in-chief of the Soviet air forces, that there was no indication in any of their writings that we had ever fought together as allies during the great patriotic war.

So, the marshal said that he himself had flown our A-20 and certainly, that the young men, the pilots, recognized that we once had fought as allies. This, of course, is not true. There is no admission of it in their writings.

The new generation of military leaders, it seems, will not have any of the rapport that we once had during the days of World War II since although—despite difficulties—we were engaged in fighting a common enemy.

This has changed. The new group is fed by ideology; it is fed by what they read. I think that the new group, especially in the military, have less contact with the West than had the men who led the Soviet armed forces during World War II.

Now, what this means for the future it is difficult to say. But at least with the men of the past you could have some common meeting ground. It is extremely difficult to find any common meeting ground with those Soviets today who are active-duty members of the armed forces.

I reject, of course, those Soviet military spokesmen who are now associated with the research institutes under the Soviet Academy of Sciences, such as General Milshteyn and others who do travel frequently in the United States. Individuals such as these certainly do not represent the Soviet military.

Senator **Warner**. Thank you. Senator Jackson?

Senator **Jackson**. While we are on the question of Soviet leadership, it is my understanding that Mr. Brezhnev came up through the strategic forces. He was in charge of those forces back in the 1950's and he brought with him into power a whole crew. This ties into what you said earlier regarding their leadership approach on these problems in terms of gigantic systems, strategic systems and so on, indicating its impact on policy.

My recollection is—and correct me if I am wrong—Suslov, who died recently, was the key player in getting rid of Khrushchev and putting Brezhnev into power. Is that correct?

Dr. **Scott**. He was a key player, Senator. Exactly who made the final decision is unknown, but Suslov certainly played a role.

Senator **Jackson**. There has been a school of thought to the effect that Mr. Brezhnev, despite his consolidation of power, was always fearful of Suslov, and that with the passing of Suslov Mr. Brezhnev will be freer to move away from the pure ideology as enunciated by Mr. Suslov. Any comments on that?

Dr. **Conquest**. I think it is true that Suslov was more of an ideologist, but in a way that is like saying on the Crusades, "Is the chaplain more aggressive than King Richard?" If your chaplain dies you still go on massacring Saracens, and you consider yourself just as good a practical Christian even if you do not remember the Athanasian Creed.

I do not see Brezhnev sitting down, kneeling at his bedside every night reciting the Theses on Feuerbach. It is all soaked into his bones insofar as ideology applies in foreign policy.

But I should, I think, also add that we do not really know a great deal about what goes and went on at the top level and there are quite respectable reports that Suslow, with all his ideological hardness, took a rather soft line on Czechoslovakia because in a certain sense he saw that the mere power play would show up the ideology in a bad light.

I think this is what Sakharov is talking about when he says that the new people whose ideologies merely are an indispensable rationale of policy and not a deep conviction, are nevertheless so keen on power and the prerequisites of power that things may not be modified in a good sense by Suslov's going, but perhaps even the opposite.

Dr. RA'ANAN. Senator Jackson, I think that there is a serious problem with the labels our media pin on factions in the Soviet leadership—describing them as moderates or hardliners, as doves or hawks.

Actually these factions are not formed to support or oppose ideas or policy issues; rather, they are constructed in feudal fashion as dependency relationship between chieftains who give you support protection and a livelihood and who promote you, and followers who, in return offer their particular leader loyalty and service in his struggle against his rivals and adversaries.

Ideas really do not play a major role in this process, but rather personal relationships. We perceive a startling resemblance to our own Western feudal ages.

However, these factions, from time to time, do exploit issues and ideas as convenient tactical weapons against each other—to score Brownie points, to demonstrate that leader A is more orthodox, while his rival B is a deviationist, a heretic, and therefore really lacks legitimacy and should be excommunicated [purged].

Nevertheless, the victors are very quick, once a factional battle is over and won, to abandon their own particular line and to pick up the fallen banner of the adversary from the battlefield. This has happened time and again in Soviet history.

Therefore, while factional disputes can give us an indication as to the questions in contention, at least temporarily, they offer us no guarantee of how the victor will behave once he has won, once the battle is over. This factor poses serious problems for decision-makers here.

As I said earlier our own media tend to oversimplify the Soviet political scene. It is very tempting, of course, to use simple labels, words to describe a Soviet leader as hard or soft, or whatever, but the realities are much more complex than that.

Incidentally, to mention one example in Suslov's case, one of the reasons why, apparently he did play a relatively cautious role in the Czechoslovak crisis was that his real task in the Soviet leadership was not to deal with ideology, despite constant reiteration to that effect in the media.

Actually, Suslov was in overall charge of relationship between the Soviet Communist Party and all other Communist Parties. One of the reasons why he is believed to have cautioned against armed intervention in Czechoslovakia was simply concern over the potential fallout of such a Soviet move on Western Communist Parties who were Suslov's constituents.

Ironically, it turned out that he was wrong, 6 months after the Soviet invasion most of the world, particularly the Western World, had forgotten all about Czechoslovakia. None of the major Communist Parties really suffered a long-term setback.

Senator WARNER. Dr. Scott?

Dr. SCOTT. I have nothing to add to the excellent discussion.

WARS BETWEEN SOCIALIST STATES

Senator JACKSON. Let us apply on a contemporary basis the problem of wars between the socialist states. I would like to get a response on this general scenario.

The Soviets obviously have some internal problems, a long list—the nationalities; the economic burden; their pursuit of hard currency right now is a classic example of some of their economic problems. They have a third of their ground forces tied up in the Far East vis-a-vis the People's Republic of China. Their military planning calls for a drawdown out of the Warsaw Pact of about 50 percent of all the ground forces they would need in an attack on NATO, and they are confronted with the Catholic Church that is strong and powerful, converging together with Solidarity. The workers in Poland, apparently, took Lenin at his word when he said, Workers of the world, unite, they have done that. Now the Soviets have a problem.

I guess my question is this: What is going to be the reaction of the leadership in the Politburo in this scenario where they find that they are unable to bring about the kind of conformity that they feel is essential in dealing with Poland yet, if they wage war, the Polish Army and the Polish people, will fight. At least that is our best current intelligence and foreign intelligence as well.

If they fight, then you have possibly the unraveling of the Warsaw Pact. How does the Soviet leadership face that kind of a situation and what do you see as the ultimate response when they are not able to bring about, shall we say, law and order in Poland?

Dr. CONQUEST. I think it is very difficult to predict what may happen in Poland, but I do not necessarily think that they would be unable to bring about an eventual crushing of the Poles.

Senator JACKSON. I assume that they would crush them, but what does that do to the Warsaw Pact? I mean, the spillover impact. Clearly, Moscow has the power to do it with whatever ruthless application of power that may be necessary.

Dr. CONQUEST. Well, as you suggest, Senator, they clearly did not want to face this situation and they played it very slow and very cagily. They have played a card which, to some extent, may or may not give them adequate control of the situation.

But if it does not, they are certainly faced with armed intervention. As has been done in Warsaw by many previous Russian rulers, they can reinstate a puppet regime and back it with every possible form of terror—to a greater degree than Czechoslovakia. Czechoslovakia did not fight, but the opposition was clearly on a nationwide scale and it is now completely contained for practical purposes. They can reproduce this situation.

The question of how much they would then trust the Polish Army—if the Polish Army fought them the Polish Army would no longer be in existence and a new, small force would have to be raised, something like the equivalent to what happened to the Hungarian Army in 1956.

It would certainly weaken them. But in the final analysis my impression would be that they would feel that to let Poland go would weaken them still more. They do not want to grasp this nettle, but if they are faced with the loss of Poland, with all of the disadvantages armed intervention would bring them, the impression given by everything they say is that if it came to the worst, they would prefer to face those disadvantages.

Dr. **RA'ANAN**. There are really two aspects to this issue: First—the vital role played by C^3I in such a contingency; there are some indications—I do not know how reliable they are—that in recent months the Soviet Union has been able to achieve fairly complete control of the Polish electronic communications network.

Once that is achieved, any resistance is likely to be sporadic, uncoordinated, uncontrolled, without central direction. As viewed from Moscow, this would be a totally different affair from having to confront a single Polish military entity, with a single chain of command and a secure communications network.

As it is, resistance possibly might involve sporadic fighting somewhere in the Carpathians along the lines of the famous Polish Home Army's operations during the period of the Nazi occupation; however, full-scale military combat is improbable.

I am rather pessimistic about the chances of Polish resistance because of these particular aspects.

The second issue mentioned concerns the subsequent reliability of Polish Warsaw Post contingents, after punitive resistance is suppressed. Actually this would matter only in one specific situation. If you have NATO forces in an essentially offensive, or at least, counter-offensive posture, then of course the unreliability of the Soviet Union's allies comes directly into play. In other words NATO forces at one stage or another, instead of retreating toward Bremen and Rotterdam, would have to be moving toward Prague and Warsaw.

However, if one is dealing with a purely defensive NATO posture, entailing essentially a brief stand, followed by a scramble for the boats along the Channel coast, then the question of the unreliability of Russia's allies, I am afraid, is not going to play much of a role.

Dr. **SCOTT**. The Soviet Union will use whatever force is necessary to maintain its position. It may do that by the use of terror which Bob Conquest has so well described in his writings. This is something that we often joke about and something that we fail to understand; it is beyond our comprehension.

If you travel through the Baltic Republics, you will see how the Soviets reduced the power of the local people, how they got rid of those able-bodied men who might do something against Soviet rule, how they either killed them or had them exiled into the Eastern part of the Soviet Union. It is not improbable or impossible that this might happen in Poland.

When that would take place—should it happen—there would be an "Iron Curtain" that would go around Poland that we, again, would find difficult to understand.

Uri Ra'anan has just mentioned how the Soviets are in a position now to control all communications. In the Soviet Union during the Cuban missile crisis there was no indication at all in Moscow that there was a crisis. The only thing that Pravda talked about was a soccer game between the Soviet Union and Czechoslovakia.

Their ability to control news; their ability to control events in an area within their own sphere of influence should not be underestimated.

Senator **JACKSON**. Mr. Chairman, I have a 10:30 meeting I must attend, and I would like to submit some questions for the record, especially a request for a comment on George Kennan's recent statements on dealing with the Soviets.

I want to commend our three scholars here today. They have been extemely helpful.

Senator **WARNER**. Thank you, Senator Jackson. We thank you again for the inspiration of holding this hearing.

Senator Cohen?

Senator **COHEN**. Thank you, Mr. Chairman.

Gentlemen, thank you for your testimony. As I was sitting here I was thinking about the story of Gertrude Stein on her deathbed. Someone approached her and said, "So, what is the answer?" I am afraid you might respond to me, "So, what is the question?"

The question I guess I have, you have given us an insight in the mind of the Soviets. You talked about all of their dogma, their doctrine, dedication and their desires.

SOVIET FEARS

I was wondering if you can tell us a little bit about their fears. For example, what does the Soviet Union have to fear from the West in the current state of affairs? Do they, for example, fear the waging of an ideological war, that we suddenly take to the ramparts and start talking about human rights that Jimmy Carter was talking about during his administration; that Max Campelman is carrying on in Madrid and other places?

Do we rebuild our strategic and conventional forces? Do we start the initiation of binary and chemical weapons? Do we cancel International Harvester contracts? Do we delay the best that we can the gas line that is going to be built from the Soviet Union to Western Europe? Do we restrict access to technology the best that we can do so? Do we transfer weapons to China?

What is it among that whole array of things that we could do that the Soviets would fear most?

Dr. **CONQUEST**. Well, I think that it is true that they fear any loss of power—not necessarily loss of power centrally but loss of some area which they have penetrated. They have the notion they must win every possible advantage every time.

I think one can go farther than that. They remember that a small group of men meeting in 1900 overthrew their predecessors in less than the period of Brezhnev's tenure of power. They are frightened of any new thought even among small groups. Certainly, they are very frightened of ideas.

Miloran Djilas, who knew them in the war, said he got the impression that Stalin's men still thought of themselves as a conspiracy—a conspiracy by now against their people. They came to power not like in China where millions were involved, and huge armies were fighting, but by a coup d'etat with a matter of a few thousand troops, and a civil war in which a few hundred thousand fought over a neutral or even hostile countryside.

They still have that feeling that they are a small group of conspirators, and are terrified they might lose power. I am sure that this is built into their whole history and attitude.

As to what particular policies you should pursue, I do not think that I am qualified to go into any detail on that.

Senator **Cohen**. You told us how they think. I think you might be in a position of saying what we should do to try and exploit those vulnerabilities and weaknesses. Certainly, you have an appreciation of the mind-set and historical deeds of the Soviets.

Then that leads to some predictability. Perhaps you can tell us what reaction they might have to any one of those theories or perhaps the totality of the responses the West might have, and what their reaction would be.

How will they cope, how will they deal with the penetration of ideas, how will they view the cancellation, declaring Poland to be in default? What would be their reaction? How do we exploit the weaknesses?

As you have indicated, we have no policy. We had no policy when they were somewhat shaken following the instance in 1956. What do we do as a nation to regain at least a sense of parity or even full superiority in dealing with the totalitarian, single-minded, brutal regime that has been going on?

Dr. **Conquest**. I quite agree that in 1956 and again in 1968 we had no contingency planning whatever in the Hungarian and Czechoslovak crises. In the Polish crisis we had some, though we were not ready for the particular development of the army coup. Among the measures the West can undertake at present, you are absolutely right that we can and must maintain the flow of ideas, we can maintain Radio Liberty and the other Western radios and this has an impact.

I do not think there is any danger to them at present from the intellectuals, from the dissidents of Russia proper, but there is certainly a much wider movement among the subject nationalities. But this is not a thing that is going to prove decisive, or produce a vast revolution in a year or two. It is just a useful "undermining" over the long run.

As to actual policies, there is as you suggest a whole array available. Such things as embargoes have great impact, in particular of course a technological embargo, and when we come to the grain embargo, there is a point I have not seen noted much or perhaps at all in the discussion of it.

In the Soviet Union there is a "strategic reserve" of grain, normally around 100 million tons—though down now to about 80 million tons. They are asking for our grain to keep up the strategic reserve which is a war reserve, for civilians but also for the army. There are large grain reserves especially kept on the European and on the Chinese front. So, that is a direct strategic vulnerability.

The technological vulnerability is enormous and should be taken advantage of; but one might also argue that the real error is that we have not used our technological advantage.

Third, of course, the question of arms buildup. We are in a very dangerous situation when people of the Kremlin start to have a superiority, even if it is not a superiority in every field.

I am sure we need political will and we need them to know with clarity what our intentions are. When it comes to Poland, they value the legitimation of their rule in Eastern Europe by us a great deal, and here we have a useful potential weapon.

Senator COHEN. Dr. Scott, I believe you indicated that following the limited Test Ban Treaty there was no significant impact upon Soviet Society. Following the signing of SALT I there was no change of heart. President Reagan on January 29, 1981, said that they reserve the right for themselves to commit any crimes, to lie and to cheat.

I was wondering, would you recommend that we sign no agreements with the Soviet Union? Are they deceitful, do they lie and cheat, do they break treaties and suppress evidence of their departure from those treaties?

Is it in our national interest to sign treaties or do business with the Soviet Union?

TREATIES WITH THE SOVIET UNION

Dr. SCOTT. They do all of the things that the President said that they do. At the same time, it is possible to negotiate with the Soviets if we are not faced with any specific time limit; if we have experienced negotiators; if we can have men at the table with the same experience that the Soviets have in dealings with us.

In negotiations we need to be extremely careful because if it suits the Soviets we find that in the past they have broken business agreements, and I think we will find they have broken other agreements as well.

To negotiate, we must do it very, very carefully and over a long term without any predetermined goals in mind.

On the problem of arms control we have the problem of verification—we have many problems. In this work I could only urge caution and very experienced personnel.

Senator COHEN. Let me ask another question along these lines. It is more of a military assessment than historical and philosophical. President Reagan is trying to rebuild our forces across the board—nuclear, strategic, conventional, chemical and already, as you have read, there is a rush to cut the defense budget.

Assuming that there are such reductions, the question in my own mind would be, where should the remaining resources be directed? Should they go to nuclear, should we put more emphasis, for example, upon the MX or the Trident, or the B-1, and we will have less to go for the conventional forces?

If we go to the conventional forces, it is just as likely that the Soviets would then gain a more superior hand at the nuclear level?

I guess it comes to the question, in your collective judgment is it more likely that the Soviet Union, if they look at our conventional buildup to offset their clear superiority in conventional forces, would resort to nuclear weapons; or are we better off putting more of our resources into nuclear capability and taking our chances at the conventional level?

Dr. SCOTT. Senator, I spend approximately 60 hours a week looking at the Soviet military structure and strategy. I would not want to comment in detail on what we should do with our own Armed Forces. Many other people are looking at this.

One thing that would bother me, though, that if the Soviets achieve and maintain a clear superiority in strategic nuclear forces then any buildup in conventional forces would be of little consequence.

Senator COHEN. So, in your judgment, then, if the United States were to enhance its C^3 capabilities and survive a first strike—a nuclear first strike, and to retaliate with a rather devastating capability, in your judgment, then, they—when looking at the conventional buildup of the United States—would not be deterred from firing that first strike even though they knew we could retaliate rather significantly?

Dr. SCOTT. That would be my opinion.

Senator COHEN. Dr. Ra'anan?

Dr. RA'ANAN. I would prefer, if I may, to pass on this particular question. I really do not feel adequately qualified. I am sure that you will be hearing other witnesses whose expertise is far greater than mine.

I should like if I may, however, to come back to your two previous questions. My colleague, Bob Conquest, started to address them along lines that I would like to continue, relating to the question of legitimation. That is one of the potential weapons in our armory.

Now, if you view the situation realistically it seems absurd that the Soviet Union should have spent as much time, effort, political capital, attention span and so on, to obtain legitimation for its conquest in Eastern Europe which it held firmly by means of military force and, indirectly through the power structure of the various local Communist Parties, and yet Moscow seemed very anxious to receive the final imprimatur of legitimacy conferred by the West.

This was reminiscent of the common-law wife, who is all the more eager for the sanctity and respectability conferred by marriage. An ironic twist is that, as far as legitimation of the Oder-Neisse line was concerned, the U.S.S.R. did not turn to the country located on the other side of that line—and that is East Germany, Pankow, and not Bonn.

The Russians understood clearly that the legitimate repository of the German nation is the Federal Republic and not the Soviet Union's own German Democratic Republic.

Many in the West have said "So what? What is the big deal? We are simply affirming something that exists anyway that we have no power to change." Correct, but the price the Soviet Union was willing to pay for this act of Western legitimation of Soviet conquests was infinitely higher than the price that we asked.

Senator COHEN. What price did they pay?

Dr. RA'ANAN. Would they pay?

Senator COHEN. Did they pay?

Dr. RA'ANAN. Nothing, essentially. If one likes one may perhaps consider "Basket 3" of the Helsinki Accords a partial Soviet payment. But then, of course, the U.S.S.R. has not kept its commitments under "Basket 3."

We have never considered seriously acts of delegitimation as a very potent weapons in international relations.

To take an example: The Soviet Union thought that it could export potential domestic problems to its various clients and allies when it initiated a modus operandi with the dispatch overseas of surrogate forces—the Cubans, the East Germans, and so on. Initially, this insulated the U.S.S.R. itself from reverberations that it is beginning now to encounter because of the dispatch of its own forces to Afghanistan—namely, domestic reactions to the effect of, "What on earth are our boys doing in that place?"

What adds to this problem is that dictatorial regimes do not tell their people what casualty rates are. The families do not know if their boys are out there fighting or indeed have been killed. So, the rumor mill starts to work and spreads speculation, such as, "It seems we may be suffering tremendous casualties." Paradoxically, the rumor mill may be exaggerating the real casualty rates!

Precisely to shield itself from such repercussions, the Soviet Union exported the problem to the Cubans in the 1970's. As a result, you have the absurd situation now in which a small island state has sent a very large proportion of its skilled military manpower far, far away from its shores.

When I was in People's Republic in mid-1980 the Chinese who enjoy political humor asked me, "What is the largest state in the world?"

Answer, "Cuba. Its troops are in Africa. Its government is in Moscow, and its population is in Miami Beach."

The Chinese are great realists and the joke had a fine cutting edge: Cuba is absurdly overextended—hence it is vulnerable. Do we know how to exploit such vulnerability. Let me toy with some ideas—not as a policy proposal but simply as a passing thought.

Has it occurred to anyone that in Miami we have some of the outstanding leaders of the Cuban revolution, including persons with a degree of veterancy that is second not even to Castro's own?

Moreover in dealing with the Cubans and discussing their military presence in areas of major importance to us, has it occurred to one of our representatives to drop a hint that, unless Castro desisted, we just might consider recognizing a Cuban government in exile? This would confront Castro with a serious domestic challenge—a very potent act of delegitimation, more dangerous for him and less risky for us that purely military actions. Delegitimation can be a very potent weapon.

Cuba is meant only to serve as an illustration; I suggest merely that we ought to think about delegitimation as a weapon in international relations.

Senator COHEN. My time is up, thank you very much.

Could I just ask you your assessment of Hendrik Smith's book on the Russians—I heard you use the words, for example, that you feel the younger generation is just as much ideologistic as those that have preceded it.

I gathered from my own reading of this book that ideology is not nearly as important to the Soviet people as a rising sense of nationalism that has nothing to do with Marxism. You have your own levels of greed and corruption, and upper-class bourgeoise practices seeking special treatment, sort of the ruling military class.

That the values are not Marxist but rather nationalist.

Dr. **Ra'anan**. Well, I think he may be right as far as the masses of the people are concerned who are profoundly apathetic indeed, cynical, about the official ideology, about the Soviet leadership and so on.

Incidentally, this is another point of vulnerability in the system. I do not know if you have heard a recent Soviet popular joke about the Soviet civil defense system.

"Comrade, what do you do when the nuclear alert sounds?"

Answer. "Comrade, you take a sheet and you crawl to the cemetery."

Question. "Why crawl?"

Answer. "Not to cause a panic."

This tells you something about popular skepticism concerning the willingness of the regime's preparedness to protect the population at large—as opposed to protecting the elite's own children. It may not tell us anything meaningful, of course, about the civil defense system's real efficacy.

Senator **Cohen**. Thank you.

Senator **Warner**. Thank you very much. Thank you, Senator Cohen.

Gentlemen, we will submit questions for the record, but I would like to ask two here in open session at his time.

MANUFACTURE OF CHEMICAL WEAPONS

This subcommittee will be given the responsibility by the chairman to make a very careful analysis at the President's request for the resumption of the manufacture of chemical weapons.

Would anyone be willing to provide some insight into that very difficult issue that will be confronting the Senate here shortly? That is certainly a very important issue as it relates not only to the United States, but to our NATO Allies.

I think we have adequate knowledge of the Soviet's activities in this field—certainly those of us who have been involved in this, and others will, I am sure, gain it.

Dr. **Conquest**. I know nothing or very little about the Soviet's actual activity in the field. But it would certainly be in accordance with their whole record to produce chemical weapons, and they are much more easy to produce clandestinely than practically any other weapon.

The answer from the Western point of view seems to be rather like ours in the Second World War. The British produced a large amount of chemical weapons. As a result chemical weapons were not used. If the Nazis had had a monopoly of chemical weapons I am certain they would have been used.

Dr. RA'ANAN. What I find somewhat frightening are signs that the Soviet Union is taking it for granted that such weapons will be used.

As you know, Soviet weapons captured in Middle Eastern wars showed that both Soviet tanks and armored personnel carriers essentially were cocoons, self-insulated for a battlefield that was assumed to be contaminated with chemical warfare agents and indeed, the vehicles carried antidotes.

Clearly, these weapons were transferred to Middle Eastern recipients not because Moscow anticipated that they would engage chemical warfare, but rather because these are the typical items in the Soviet inventory and Soviet armaments industry could not be bothered to make changes for export. Another factor to be considered: From what we know about Soviet civil defense facilities, chemical decontamination chambers seem to play nearly as important a part as radiation decontamination.

Thus one has to assume the Soviet Union is extremely serious about chemical warfare. Whether our renewed manufacture of such weapons at this point would serve to deter Moscow is very difficult to predict. However, our working assumption has to be that the Russians do mean to resort to chemical weapons.

Dr. SCOTT. Very little is said in open Soviet literature about how they, themselves would use chemical weapons. Indirectly there are many indications, as Uri Ra'anan stated, that the Soviets assume that any future war will involve chemical weapons.

There are three military schools in the Soviet Union that train officers for chemical defense, so-called chemical defense. These take youths from age 17 to 22, give them 4- to 5-year courses.

Senator WARNER. Excuse me, I am missing a few words and I am very much interested in what you are saying. Are these schools specifically and solely for the purpose of chemical and biological warfare?

SCHOOLS OF CHEMICAL DEFENSE

Dr. SCOTT. Yes, Senator. They are identified as Schools of Chemical Defense. There are three such schools for training officers. They take the cadet, give him a 4-year course and a commission in chemical warfare.

Senator WARNER. It is a 4-year curriculum?

Dr. SCOTT. Yes, a 4-year course.

Senator WARNER. Will he have finished his, say, Annapolis, West Point training and then would be a graduate?

Dr. SCOTT. No. This is roughly the equivalent of Annapolis, West Point, or the Air Force Academy.

Senator WARNER. What is the magnitude of numbers that these schools turn out?

Dr. SCOTT. We are unable to determine the specific size of these three schools. There are, for example, five schools that turn out officers for the strategic rocket forces. There are, I believe, about 14 schools that turn out officers for air defense. There are about six or seven schools—I forget the exact number—who turn out officers for the tank troops. So, there are three schools that turn out officers for chemical defense.

In addition to this, there is a Chemical Defense Academy that does professional training for the officers in the chemical defense branch. The Chemical Defense Academy has very close ties with the Academy of Sciences. It appears to be a very high level academy, similar somewhat to the Command and Staff School at Leavenworth, not quite on the level of our War Colleges, but only slightly below them.

STRATEGIC ARMS TALKS

Senator **Warner**. Let me ask a question. I am hopeful that the administration will continue on its goal to try and initiate in 1982 strategic arms talks, commonly referred to as START. Integral to that analysis will be the subject of verification.

Do you have reason to believe that we will make any breakthrough in the area of verification that may well be required now in view of the mobility of some of the strategic systems in the direction of on-site inspection?

The question in general is on verification and the likelihood of any breakthrough to increase the reciprocal means by which to monitor the systems.

Dr. **Conquest**. It is the one thing they have been fairly adamant about since the beginning of the whole arms talks. I have not seen anything to suggest that they are likely to change their position.

I am entirely in agreement with Uri that arms talks should proceed and should be conducted with skill and persistence—as is urged, of course, by Academician Sakharov who is one of the leading figures in the whole world on public disarmament—but who also warns against getting superficial agreements which do not go to the heart of the matter and deceive the West.

That we are likely to get any substantial advance seems most unlikely at present. But we should proceed, I would say, with the rest of our policies while hammering at that at the same time. At present there seems little hope of early success.

Senator **Warner**. Thank you. Yes?

Dr. **Ra'anan**. I agree with my colleague, I believe that the chances are minimal of an adequate verification modality, receiving Moscow's consent.

With regard to arms control negotiations in general, and in fact all types of negotiations with the Soviet Union, I should like to emphasize that they are best conducted at the lowest-possible working level, at the technical level; as far away as feasible from the limelight of the cameras and from radio.

The greatest danger in this context is premature summitry. When we escalate to that level, we put enormous pressures upon ourselves because the Western concept of the man of reason is one who compromises. Our public comes to view compromise as desirable goal in itself, and when Western newspaper headlines speak of optimism—they mean that we are going to reach an agreement, while pessimism means that no agreement is in sight. For readers will ask, "Is it a good agreement or is it not?" And, if the latter, perhaps optimism should mean that we will not agree.

Therefore, such talks should be conducted cautiously, deliberately, at great length, at a technical working level, and in the least public and most remote and inaccessible location that can be utilized. As long as these conditions can be met I think there may be some chance of coming up with a modest, but still useful, reasonably equitable agreement.

However, I am completely in agreement with Bob Conquest on the question of verification.

Dr. SCOTT. The problem of verification will be with us for some time. The secrecy of the Soviet Union is difficult, again, to understand. Of the 400 largest Soviet cities, approximately 300 of them are still closed to foreign visitors. I estimate that over 95 percent of the Soviet land area is closed to foreign travel.

It is a concept, it is a feeling, an attitude of secrecy that does not exist anywhere else.

Now, in 1963, at the time of the signing of the Test Ban Agreement, I recall there was some optimism in the United States that we could go on with further negotiations and even some possibility of on-site inspections. The Soviets did drop hints at that time that a limited on-site inspection agreement could be reached. However, other things prevented this and nothing materialized.

But in looking at studies to see if we can achieve on-site inspections, would the Soviets agree to on-site inspection of any consequence, it would mean a marked, significant change in the total Soviet structure.

Senator WARNER. Gentlemen, I thank you very much. I must go now and join a committee meeting of the Energy Committee.

I have asked counsel to the committee to consult with you individually as to how best we can help you in the requests that we make that you reply to certain questions. You are here as volunteers on behalf of your country, and I do not want to overburden you with secretarial expenses and others of that nature.

So, we will try on an individual basis to see what we can do to facilitate and make least expensive in time and dollars the hoped-for replies to a number of questions from the committee.

On behalf of all members of the committee and Chairman Tower, I thank you for your testimony today.

[Questions, with answers supplied, follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN WARNER

SOVIET ECONOMIC DIFFICULTIES

Senator WARNER. Dr. Ra'anan, could you comment on the current economic difficulties the Soviet Union is having, especially in its hard currency shortages, its debt obligations to Poland and Eastern Europe, and its chronic food shortages. Do you see these factors as intensifying and perhaps pointing the Soviet Union towards a more adventurist and aggressive course?

Professor RA'ANAN. It is one of the ironies of history, that an avowedly Marxist regime should always grant politics unconditional supremacy over economics! This is one of the reasons why I am not sure that the satiated Bear necessarily is less dangerous than a hungry one. I have not found that economic concessions have much of an impact on Soviet politico-military decisions (although the Kremlin believes its capitalist adversaries can be swayed by crassly material considerations). Moreover, regimes of that type resort to an offensive strategy because they believe that "conditions are ripe," i.e. that they can do so with impunity, rather than because of weaknesses, economic or other. If Moscow is on an aggressive course, it is precisely because its leadership has convinced itself that this posture is not "adventuristic," i.e. that the risks are low. Indeed, how much of a price has the West made Russia pay for Afghanistan or for Poland?

Senator **WARNER**. Dr. Ra'anan, I was struck by your comment concerning the likelihood that the Soviet Union would be unlikely to permit, through its strategic targeting plan, the U.S. C^3 system to survive a first strike so as to facilitiate a negotiated end to hostilities. What should this conclusion mean for designing and planning the usage of this system in a wartime situation?

Professor **RA'ANAN**. The survival of our C^3 system must have priority in current planning with particular emphasis upon planned redundancy, since no single approach or channel can be guaranteed against disruption. Since Soviet military Literature stresses that the ultimate objective in global conflict is the annihilation of the adversary's capacity and will to continue organized resistance and the consequent collapse of his government and society, it is evident that disruption of his C^3 system is a prime objective.

EUROPEAN NEUTRALIZATION

Senator **WARNER**. From your studies of Soviet history and foreign policy, what importance has been attached over time to the dismemberment of the North Atlantic Treaty Organization—NATO?

Professor **RA'ANAN**. Since Lenin, and in orthodox conformity with the logic of the Hegelian Dialectic, Soviet international strategy has attempted to exploit "existing contradictions" between the "principal antagonist," "secondary adversaries," and "the enemy's reserves." Since World War II, the United States has been the "principal antagonist," our allies are the "secondary adversaries," and the Third World constitutes "the reserves." The disruption of the Alliance, therefore, is classical Soviet strategy and exploitation of "existing contradictions" in the anti-Soviet camp remains top priority in Moscow, as always.

Dr. **CONQUEST**. To destroy, or to outflank, NATO have been the central preoccupations of Soviet policy for a generation.

Dr. **SCOTT**. Dismemberment of NATO is a primary goal of both Soviet foreign and military policy. The alleged "aggressive nature of NATO" and the danger it poses to world peace are major continuing themes of Soviet propagandists. Other alleged "aggressive military blocks of imperialism," headed by the United States, also come under constant attack in both the Soviet civilian and military press, but none with the same intensity as given to NATO. The Soviet leadership would like bilateral arrangements with each of the Western European nations, so that these nations separately would be forced into the Soviet orbit.

Senator **WARNER**. Has this remained a central goal of Soviet diplomatic and military policy since the Second World War and do you believe the Soviet Union to be closer to achieving this objective today than at any other time since World War II?

Professor **RA'ANAN**. The answer to both parts of the question unfortunately appears to be, "yes," although there seem to have been some recent positive trends in our relations with France. From Moscow's point of view, however, Europe, as always, remains the key to global hegemony, and Germany, as always, remains the key to Europe. There is little doubt that the USSR has scored most significant gains in its campaign to neutralize the Federal Republic of Germany. "Rapallo" continues to be the Kremlin's dream and a nightmare for the West. Despite World War II, Soviet *leaders* do not fear Germany; they regard it as a potential partner.

Dr. **CONQUEST**. It has, and NATO certainly seems shakier than ever before.

Dr. **SCOTT**. Dismemberment of NATO has been a central goal of Soviet diplomatic and military policy since NATO was established. The growing "peace movement" in many of the NATO nations, especially in Holland and West Germany, may pose the greatest danger that NATO yet has faced.

Senator **WARNER**. What are the implications for American, as well as European, security of such a development and what steps do you believe should be taken to forestall such a development?

Professor **RA'ANAN**. A hesitant America, unsure of itself (as in the unfortunate reversals over the enhanced radiation weapon, under an earlier Administration), and attempting to maintain NATO cohesion by searching for the Lowest Common Denominator among the Allies, is likely to find either that the Alliance gradually will become a hollow shell or that the Allies will defect, one by one. An America that shows unflagging determination and strong leadership over security issues, and is not deterred by temporary unpopularity in one European capital or another, will find the Allies responding gradually, perhaps with an outward display of reluctance, but with inner relief that NATO has a reliable leader once more.

Dr. **Conquest**. Things are not quite critical yet, but steps need to be taken, which would include a great increase in conventional defensive weaponry on the one hand, and an extension, if possible world-wide, of NATO's area of competence.

Dr. **Scott**. Should NATO be eliminated, the individual nations of Europe would be unable to cope with the political, military, and economic pressures that the Soviet Union could bring to bear against each. The nations of Europe would become "Finlandized" more than Finland is today, losing control not only over the conduct of their foreign policy, but also over their economies.

Some possible measures to lessen the danger to NATO as a result of the so-called "peace movement" are as follows:

First, the United States should give continued emphasis to the statements made by President Reagan that meaningful arms control and arms reduction measures should be negotiated.

Second, the role of the Soviet Union in the so-called "peace movement" should be analyzed, and Western European nations should understand the double standard employed by the Soviets. NATO peace groups and demonstrations are encouraged by Moscow, while for Soviet citizens pacifism is considered as being anti-Soviet and contrary to Marxist-Leninist ideals.

Third, the United States should show its own resolve by prudently building up its own military strength and by instituting a program of national service for all youth. Many Europeans frequently remind us that they have compulsory military service, while the United States seeks to depend upon a volunteer military force.

PLAYING THE CHINESE CARD

Senator **Warner**. How does the U.S.S.R. regard the People's Republic of China—as an aggressive menace on their southern flank or an easily-neutralized nuisance?

Professor **Ra'anan**. The Kremlin's alleged "fear" of China, strangely enough, is largely a concoction of Western origin—although "fed" from time to time by appropriate Soviet "disinformation." Anyone who has visited Chinese military installations knows that the concept of a Chinese *offensive* "threat" to the U.S.S.R. is ludicrous—and who knows this better than Soviet military intelligence (GRU)? If the Kremlin really were "afraid," why has it kept rejecting very reasonable Chinese proposals for mutual military disengagement along the frontier to lower the risk of surprise attack? It is *not* China that has tried to tempt us into colluding with it so that a surprise surgical strike might be launched against the U.S.S.R.—such a proposal was made to us by the *Russians,* with China as the intended victim.

Dr. **Scott**. The Soviets have a fear of the Chinese, a fear that to many Westerners may appear irrational. They see the Chinese as an aggressive menace, a vast horde of people pressing against their borders. At the same time, however, they would like an accommodation with the Chinese. In particular, this is true at present, while the Polish issue is undecided.

Senator **Warner**. To what degree do you regard Soviet investments to counter the Chinese as being unavailable for a war against Europe and, therefore, as not being factors in NATO/Warsaw Pact Force-balance calculations?

Professor **Ra'anan**. Well over half the 45 crack Soviet divisions along the Chinese frontier could be transferred elsewhere without serious risk—particularly since the Chinese neither have the capability nor the desire to launch an offensive into the Siberian tundra. It is the Red Army, not China's PLA, that is in offensive deployment. Moreover, the PRC recently has signaled its willingness to moderate the tone of the Sino-Soviet dispute. It is entirely up to Moscow, therefore, to decide how much military force really has to be deployed against China. As for nuclear weapons, I have serious doubts about the accuracy of reports that ¼ of Soviet warheads, are targeting China now (or would continue to do so).

One-tenth would be ample, in case of a Soviet offensive in Europe, to "secure" the Soviet-Chinese "front."

Dr. **Scott**. Soviet military investments that might counter the Chinese also can be concentrated against NATO forces should the Kremlin consider it necessary. For example. SS-20 missiles based near Chelyabnisk, on the eastern side of the Urals, can strike targets in portions of both China and some of the NATO nations. An overnight move of these mobile missiles to the east would permit coverage of almost all of the Chinese mainland. An overnight move of a few hundred kilometers to the west would provide a capability to strike most of NATO territory. Aircraft also easily could be shuttled from one front to another. The Soviet military air transport force, augmented by Aeroflot aircraft, could move entire divisions of the Soviet Troops of the Far East to the Western regions of the Soviet Union. *All* Soviet theater forces must be factors in NATO/Warsaw Pact Force-balance calculations.

Senator **Warner**. Dr. Conquest, could you comment on the thesis that the Soviet Union will be most dangerous toward the end of the decade. Instead of enjoying the fruits of superpower status, the Soviet Union will see its economy stagnating, its population increasingly non-Russian, and its empire crumbling. Its only success will be its military, and the Soviet Union will be even more aggressive in attempting to hold on to what it has had.

Dr. **Conquest**. This is clearly true up to a point, though the decline of the Soviet economy is in part dependent on the degree to which we bail them out. At the same time, their propensity to aggression will affect their actual practice to the degree to which we fail to strengthen our own military-political stance.

Senator **Warner**. Dr. Conquest, you raise the interesting point that it is difficult, if not impossible, to change the political indoctrination or orientation of the Soviet people or their government.

Are we to conclude from this remark that diplomatic, military procurement and arms control initiatives taken by this country in the spirit of "setting an example" for the U.S.S.R. to follow, are doomed to fail?

Dr. **Conquest**. Yes.

SOVIET PERCEPTIONS OF U.S. MILITARY CAPABILITIES

Senator **Warner**. From your analysis of Soviet thought and writings, what conclusions can we draw about the degree to which U.S. military capabilities pose a credible and effective deterrent to Soviet aggression?

Dr. **Scott**. Based on an analysis of Soviet military writings, the most credible and effective deterrent to Soviet aggression at this time is the United States strategic nuclear Triad—ICBMs, nuclear submarines armed with ballistic missiles, and long-range aircraft. To a lesser extent, the Soviets are deterred by our theater nuclear forces—primarily aircraft on forward bases and carrier-based aircraft.

Senator **Warner**. What appear to be the great areas of weakness—the American armed forces, our military doctrine or strategy, or simply our perceived will to resist such aggression?

Dr. **Scott**. The greatest area of weakness in American military power, as perceived by the Soviets, appears to be our lack of a military strategy. As a Soviet once remarked, "In the United States strategic superiority is equated with superiority in weapons systems. But strategic superiority means a superior strategy—and that you have never had."

The Soviets are uncertain about our will to resist aggression. This has been particularly true in the past, when leadership in both the Party and the Party-military structure was in the hands of men who personally knew the role of the United States in World War II. Younger leaders may have less respect for United States resolve and the ability of our armed forces. This could lead to serious Soviet mistakes.

SOVIET ATTITUDES ON CHEMICAL WARFARE

Senator **Warner**. Dr. Scott, you are, no doubt, familiar with the evidence which is becoming available concerning Soviet and Soviet/proxy uses of chemical and toxic weapons in Southeast and Southwest Asia. To what degree do Soviet history, doctrine, or attitudes toward international treaty obligations support or contradict such activities?

Dr. **Scott**. Soviet military doctrine calls for the preparation of the Armed Forces, the economy, and all the Soviet people for fighting in an environment in which nuclear, chemical, and bacteriological weapons will be used. Billions of rubles are spent each year to ensure that the doctrine is being implemented. For training purposes, it always is the "enemy" who initiates the use of such weapons. However, this training is equally applicable for the Soviet first use of chemical and toxic weapons, in their various forms.

The Soviet Union attempts to give the appearance of being law-abiding in keeping to the letter of international agreements, while at the same time frequently violating the spirit of such agreements. They also are adept at finding loopholes in agreements, making proof of violations difficult.

Preventing free elections in Eastern Europe at the conclusion of World War II, breaking the moratorium on atmospheric testing of nuclear weapons in 1961, and the deployment of MiG-23s, an aircraft with a nuclear delivery capability, to Cuba—the list of broken Soviet agreements could go on and on.

Based on the above, possible Soviet agreements that the production of chemical weapons in the Soviet Union will cease, and that no further use will be made of chemical weapons in combat outside of the USSR should be treated with extreme caution.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

THE RESOURCE WAR

Senator **THURMOND**. How do you assess the resource war? Do you feel that the Soviets have specific strategic goals in this area?

Professor **RA'ANAN**. With regard to Soviet goals, the answer, in all probabililty, has to be positive, provided the accent is on "strategic," meaning long-term in this context. When it comes to actual implementation, Soviet operations do not necessarily followed a predetermined blueprint—i.e., timetable—but rather aim at "targets of opportunity," that can be hit at low cost for the USSR. Sometimes, the "strategic" and the "tactical" coincide, as in Soviet policy vis-a-vis the resource-rich southern portion of Africa.

Dr. **CONQUEST**. They go for targets of opportunity as the arise, but certainly has as major hopes the ability to deny the West the oil of the Middle East and the strategic minerals of southern Africa.

Dr. **SCOTT**. Soviet strategists emphasize that war has many aspects—political, economic, scientific, technological, military, psychological, and other. Armed combat is only one aspect of war. Economics, according to Soviet spokesmen, is a major factor in war, and the military forces of a nation, as well as its doctrine and strategy, are dependent upon its level of economic development.

A major task of the Institute of World Economy and International Relations of the Soviet Academy of Sciences, is to determine the resource vulnerabilities of the West, and particularly of the United States. Any detailed analysis of Soviet presence in the Third World will suggest that they have specific strategic goals with respect to critical materials, both for obtaining such materials for themselves and denying them to the United States.

Senator **THURMOND**. How vulnerable do you feel the U.S. is to import cut-off strategic materials?

Professor **RA'ANAN**. As of now, our vulnerability is high. It is essential to create the infrastructure for potential surge mobilization. A carefully planned and vigorously implemented stockpiling program can provide us with the necessary reserves to do without such imports, if need be, for the duration of an actual crisis. Last year, the Fletcher School's International Security Studies Program held a conference on this very topic and published a summary containing policy implication (the major input coming from my colleagues, Prof. R. L. Pfaltzgraff), that I should be happy to send you.

Dr. **SCOTT**. The United States now is vulnerable in a number of ways to a cut-off of strategic materials engineered by the Soviets. This cut-off might be achieved by the Soviets secretly buying up such materials, or by controlling the governments of nations which control the materials. Vulnerability of the United States to an import cut-off is increased as the Soviets gain control of increased percentages of the world's merchant marine. In the event of a major conflict, the Soviet surface fleet and submarines, combined with naval aircraft, would be in a position to hinder seriously or to prevent, the United States from importing needed resources.

IMPACT OF RADIO FREE EUROPE

Senator **THURMOND**. What impact have such programs as Radio Free Europe and Voice of America had in the past?

Professor **RA'ANAN**. Radio Liberty/Radio Free Europe has performed an essential service, at a high professional level, and its careful monitoring of "audience feedback" from the Soviet Bloc has not only demonstrated how effective it is, but has provided analysts and the academic community with invaluable political and sociological data "from behind the curtain." The same community has also benefitted immensely from the very scholarly RFE/RL Background Paper, which constitute part of the analytical infrastructure for the radio program. Perhaps the best testimonial to RFE/RL effectiveness comes from strenuous Soviet attempts to obliterate this institution. With regard to the Voice, I believe my colleagues may be better informed than I am.

Dr. **CONQUEST**. They have had considerable impact, mainly of a general kind, in fortifying the spirit of dissent; but also, occasionally, immediate political impact, as when the Polish Secret Police defector Swiatlo's broadcast revelations helped destroy the then government's morale.

Dr. **Scott**. Having traveled to practically all places in the Soviet Union open to foreigners during my two tours of duty in the United States Embassy, Moscow, I can say with confidence that both Radio Free Europe and the Voice of America have had a major impact upon the peoples of the Soviet Union and Eastern Europe. Radio broadcasts from the United States and other NATO nations are the only alternative news source that the people in the Soviet Union have to their own completely controlled news media. the hundreds of millions of rubles that the Soviets spend on expensive jamming devices indicate the Kremlin's fear of permitting the Soviet people from knowing what really is taking place in the world.

Senator **Thurmond**. With the current unrest in Poland, what importance do programs like Radio Free Europe have?

Professor **Ra'anan**. In such crisis periods, of course, RFE/RL demonstrates particularly how essential it is—all the more so since, with the exception of these radio programs, Western reactions to Poland's martyrdom have been so feeble that the masses of the Polish people must feel alone and discouraged.

Dr. **Conquest**. Very great importance. And the idea of non-partisan "objectivity" in these broadcasts, now being touted to mean the inclusion of pro-Communist or anti-Western material strikes any serious student of world politics as a notion out of a pre-teenage debating society. Democracy's weapons should not be blunt, or suicidal.

Dr. **Scott**. People struggling for their independence can endure much greater hardships and privation if they know they are not alone. With the imposition of martial law in Poland, all communications came under complete control of the military authorities. Radio Free Europe was able to tell the Polish people what was happening in their own nation.

The Voice of America and Radio Free Europe are among our most powerful means of getting the truth before the peoples of the Soviet bloc. If the peoples of these nations know what actually is taking place with respect to Poland and Afghanistan, the Kremlin may find it prudent to act with greater caution and less aggressiveness.

RECOGNIZING A CUBAN GOVERNMENT IN EXILE

Senator **Thurmond**. What consequences would be involved should the U.S. recognize a government in exile from Cuba?

Professor **Ra'anan**. In my testimony, I mentioned this topic essentially as a "for instance," to illustrate how the threat of delegitimation might be utilized as a negotiation asset. At this stage, for example, the implication that we might support such a government in exile, could serve as a potent "bargaining chip" to induce Castro to ponder whether it might not be worth his while to terminate his military ventures overseas. Behind a threat, of course, there should be always the determination to follow through if necessary.

Dr. **Conquest**. Senator, I believe that this is a very important question, and one not yet properly discussed in the West. I suggested earlier that the whole business of legitimizing the Soviet stooge regimes in Eastern Europe is of importance to the Kremlin politically, and can be used against them.

I meant this to imply the possible recognition by the West of a true Polish Government, in exile (as I believe we should have done with Hungary in 1956). How much truer this is of Cuba: indeed, why was it not done after the Angola aggression? I would add, however, that such a political move has to be carefully prepared: emigre politicians are notoriously quarrelsome, and it would be important that all democratic points of view from moderate socialists to catholic democrats be represented. And one would hope that the previous aggreement of the better-natured Latin American states would have been secured. Given that, an excellent political weapon.

Dr. **Scott**. The consequences of recognition by the United States of a government in exile from Cuba would depend upon a number of factors as, for example, where would the government in exile be located? Other questions would be who would head such a government, and what nations other than the United States might give recognition.

Questions Submitted by Senator Henry Jackson

NUCLEAR SUPERIORITY OR INFERIORITY

Senator **Jackson**. Dr. Conquest, on January 27 this year, Senator Biden sponsored a luncheon briefing for Senators here on the hill on "Dealing with the Soviet Union," and the discussion was led by George F. Kennan.

Among the main points made by Ambassador Kennan were the following:

Nuclear superiority or inferiority, in the statistical sense, has no meaning; statistical disparities between the arsenals on the two sides are quite meaningless.

There is no evidence that the Soviet Union is disposed to occupy western Europe or that it has the necessary political talent and resources to even dream about it.

The most effective and sensible foreign policy for the U.S. is to make a success of our own society rather than to try to direct events around the globe.

You are undoubtedly familiar with George Kennan's views on U.S.-U.S.S.R relations. We would appreciate your reflections on his interpretation of Soviet capabilities and intentions.

Dr. CONQUEST. Ambassador Kennan has a great store of intelligence, of information, and of moral commitment. I doubt if these are matched by an equivalent sense of judgement; and my doubts are shared, I should add, by many, perhaps most, students of Soviet attitudes and intentions.

His points seem to strengthen such skepticism. The first, that nuclear superiority or inferiority have no meaning appears typical. On the one hand it is to say something so obvious that it hardly needs saying at all—that warhead counts and so on must be considered in a context of the defensibility of sites, the undetectability of submarines and all sorts of other factors. What Kennan seems to be doing here is to make an unexceptionable point in such a way as to suggest something which is false.

On the second point, once again one is staggered by its abstract meaninglessness. Does the Soviet High Command have a plan for the possible invasion of Western Europe? Of course it does: that is what planning staffs are for. Do the Soviet leaders believe that the whole world must sooner or later be Sovietized? Of course they do, and *Pravda* states it with what one might regard as excessive frequency. Do they maintain that the Communization of the world involves control by the U.S.S.R. of all the emerging Communist regimes? Again, it is obvious that non-Muscovite Communism from Dubcek's to Mao's are illegitimate from the Soviet Point of view, and must be replaced by the Soviet model as and when feasible. So in principle, and in the longer run, the Kremlin envisages the Sovietization of Western Europe—eventually, indeed, of the USA too. Whether current Soviet tactics envisage for an intermediate stage the Finlandization or the more rapid Communization of Western Europe is another matter. "Evidence" is any sense acceptable to schematic minds will not be forthcoming, the Politburo's minutes remaining secret. Either way the result would be disastrous to the USA, with a doubling or trebling of the industrial base available to the USSR in the world struggle, let alone the political debit of a Washington prepared to write off its allies. Nor can we assert that direct invasion and Communization might not be the chosen tactic in favorable circumstances, as with "western" Czechoslovakia and Estonia. It is true that the talent and resources for ruling Western Europe are missing: So they were for running Czechoslovakia and Poland, as we have seen. If the disincentives to invasion are sufficient, it will not take place. If other methods of assimilation are available, it may not be necessary. But to assume that it cannot happen is to recommend taking no precautions against it; which is to do the one thing which could provoke it.

Kennan's third point shares this vacuity. "Making a success of our own society" is not a logical alternative to "trying to direct events round the globe"—by which Kennan appears to mean having a foreign policy. Ignoring the outside world and perfecting one's own society cannot, above all, constitute a defense against outsiders. When King Croesus showed Solon his kingdom's wealth, Solon replied that anyone with better iron would soon have all that gold.

What seems to emerge is that Kennan is not, or is no longer, a man of the world when it comes to international affairs, but rather a spinner of logic-chopping subtleties mixed with breathless naiveties, recalling the Sophists' proofs that Achilles could not catch the tortoise. When he was in Moscow, Kennan's nose was continually rubbed in the realities. Deprived of that roughage for so long—thirty years now, I think—his mind has relapsed into the charitable but unfounded idea that all men, the Politburo included, are more or less motivated as we are; and he illustrates this with attractive but exasperating intellectual pirouettes.

It is instructive to compare Kennan with the world figure most deeply and continually concerned with preventing nuclear war, Academician Sakharov, whose standing even in the most "liberal" circles in the West is, to put it mildly, at least as high as Kennan's. Unlike Kennan, Sakharov is in constant contact with Soviet reality; and he not only rejects such views as Kennan's about the attitudes and intentions of the Soviet leaders, but regards illusions based on them as a positive danger to world peace.

SOVIET PEACE OFFENSIVE

Senator **Jackson**. Dr. Ra'anan, I believe it is generally agreed that the Soviets have been making headway with their so-called "peace offensive," depicting the United States as war-loving. Certain circles in both West Europe and in this country are sympathetic to this line.

In light of your long study of the Soviet Union, what would you say to these people?

Dr. **Ra'anan**. I would warn them that, so far from being eager to engage in conflict with the U.S.S.R. in Europe, the United States is witnessing the reemergence of isolationist trends, particularly elements that are beginning to say, "if our allies are unwilling to stand by us in Central America or the Middle East, if they don't want us to defend them in Europe or to let our boys there have the weapons needed to protect them, then let us do them a favor and bring the boys back home!" It is the behavior of these European's that is feeding such sentiments and Europe's real danger is *not* becoming an innocent victim of an American-Soviet conflict, but rather annoying Mid-America to the point where it will leave the Europeans alone, face-to-face with the Red Army, to discover the joys of being Finland—or Poland! (given the supremacy of the Red Army under such circumstances, merely being "Finlandized" would be a relative luxury!) Our arguments would carry greater conviction, of course, if, like our allies, we had National Service—since they keep harping upon the defense burden shouldered by their younger generation as one of the cause of the growth of neutralism.

[Whereupon, at 11:14 a.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

WEDNESDAY, FEBRUARY 24, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

STRATEGIC FORCES OVERVIEW

The subcommittee met, in open session, pursuant to notice at 8 a.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman).

Present: Senators Warner, Goldwater, and Exon.

Staff present: Frank Gaffney, professionial staff member; Francis J. Sullivan, minority staff director; George K. Johnson, Jr., José E. Martinez, Patrick L. Renehan; Carl M. Smith, James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon; Greg Pallas, assistant to Senator Exon; and Peter Lennon, assistant to Senator Levin.

Senator **GOLDWATER** [presiding]. The committee will come to order.

Some of our members will be a little bit late because they just returned late last night from a meeting in England.

I have no opening statement. I will submit an opening statement by Senator John Warner.

[The prepared statement of Senator John W. Warner follows:]

PREPARED STATEMENT BY SENATOR JOHN W. WARNER

The subcommittee is pleased to welcome back Gen. Bennie Davis. General Davis has been asked to appear today in his capacity as Commander-in-Chief, Strategic Air Command, and Director, Joint Strategic Target Planning staff. In view of his responsibilities for the operation and targeting of the United States' strategic forces, it is hoped that General Davis will provide the subcommittee with an overview of the current status of those forces. In addition, we hope to explore once again with this distinguished military officer his professional, military assessment of the ability of America's nuclear deterrent to continue to deter war in the future as successfully as it has in the past.

It goes without saying that, as we scrutinize the President's budget for unnecessary programs, we will be attaching particular importance to General Davis' comments concerning the essentiality to the national security of expensive programs like the MX, the B-1, the cruise missile, the Trident system, etc.

I would note that we have asked General Davis to return subsequently on February 26, to discuss the retirement of the Titan II missile system and again on March 12 in his capacity as Director of the Joint Strategic Connectivity Staff to comment on our command, control and communications capabilities and related issues. It is my hope that the members will use those meetings rather than this one to address detailed questions in the aforementioned areas.

General Davis, I would like to remain as long as possible in open session and then, at an appropriate time, to go into executive session.

Senator GOLDWATER. General Davis, it is a real pleasure and honor to have you and your staff with us. We are most anxious to hear your opinion of our strategic abilities in the air, so, take off.

STATEMENT OF GEN. B. L. DAVIS, USAF, COMMANDER IN CHIEF, STRATEGIC AIR COMMAND AND DIRECTOR, STRATEGIC TARGET PLANNING; DIRECTOR, STRATEGIC CONNECTIVITY, JOINT CHIEFS OF STAFF, ACCOMPANIED BY MAJ. GEN. CHRISTOPHER S. ADAMS, USAF, DIRECTOR, STRATEGIC PLANNING STAFF, SAC

General DAVIS. Thank you very, very much, Senator Goldwater.

I welcome the opportunity to appear before you and the members of the subcommittee to discuss the administration's strategic force modernization program, as the Commander in Chief of the Stragegic Air Command, as Director of the Joint Strategic Target Planning Staff [JSTPS].

I have with me this morning, at the committee's request and certainly at my pleasure, Major General Adams, who is also the Director of the Strategic Planning Staff, a portion of the Joint Strategic Target Planning Staff.

I am also the Director, as you know, of the new organization within the Staff, the Joint Strategic Connectivity Staff [JSCS]. I will be responsible for implementing that program, that modernization program, and insuring that this Nation receives the maximum benefit from the resources extended and that the strategic imbalance is corrected as quickly and efficiently as possible.

By way of an update on that imbalance, the relative strategic warfighting capabilities of the United States and the Soviet Union remain essentially unchanged from those portrayed in the handout distributed to this committee last November.

At this time I would like to submit my classified statement and, with your approval, provide a brief unclassified summary.

Senator GOLDWATER. That will be fine, General.

General DAVIS. I would like to begin by expressing my appreciation for the support which this committee, the Senate, and the entire Congress demonstrated during the last budget year. I am confident that SAC, the Air Force, and the Military Services as a whole will prove that support was well deserved as we proceed along the long road to strategic recovery.

SAC's primary responsibility is maintaining forces that provide an effective deterrent capability for our Nation. As you know, for over 35 years we have been eminently successful in accomplishing this deterrent mission; however, today's forces, which were designed to support a strategy of assured destruction, are not well suited for supporting our current and future defense requirements.

For combatant commanders to meet today's defense policy requirements, they must possess the capability to successfully engage the enemy in battle and defeat him. For SAC, this means maintaining strategic forces which are capable of destroying, neutralizing, or disrupting the enemy in a measured and selective manner across the conflict spectrum, whether nuclear or conventional, spasmodic or protracted.

Successfully meeting today's guidance with current forces and supporting C^3—command, control, and communication—has become tenuous at best. Strategic modernization is now a military necessity.

As the combatant commander with the responsibility for maintaining two legs of the strategic Triad, I fully support the administration's strategic modernization program.

As you know, the program includes improvement of our land-based missiles, to include reducing their vulnerability; modernization of the strategic bomber force; deployment of new submarine-launched missiles; improvements in command, control, communications, and intelligence [C^3I] systems for our forces; and the restoration of our strategic defensive forces in cooperation with Canada.

This comprehensive package begins a modernization process which will assure the continued integrity of our Triad of forces and provide a strong framework for correcting the deterioration of the strategic nuclear balance that has occurred over the years.

The President's package must be viewed in its entirety to fully appreciate the contribution it makes to an effective deterrent force.

COMMITMENT TO TRIAD

First and most important, the President's decision reaffirms our commitment to a Triad of land- and sea-launched ballistic missiles and manned penetrating bombers. A balanced and modernized force of these three systems and their essential command and control systems will continue to pose a complex problem for the Soviet military planner. Because each element has its own unique characteristics and different mode of operation, it is extremely difficult for an aggressor to counter all three simultaneously.

For the past 20 years we have been living off the strategic muscle created by some far-thinking administrations in the 1950's and 1960's. Today, constantly advancing weapon technology threatens the continued competitiveness of certain elements of our Triad.

The threats that these systems must contend with are far more sophisticated than those they were designed against decades ago and we expect the same trend to continue.

If future generations are to enjoy the security and stability we benefited from in the past, we must keep our Triad modern and strong, allowing no leg to remain vulnerable to the soviet threat. The President's program is designed to meet these objectives and as an operational commander I applaud this commitment to retain the integrity of our Triad.

STRATEGIC NUCLEAR IMBALANCE

The second major contribution of the total package is the progress it makes toward redressing the strategic nuclear imbalance.

Shortly after the President announced his strategic modernization program we conducted an analysis of its impact in restoring the nuclear balance.

I would like to summarize the two primary conclusions of that analysis:

First, the President's program, by including the B-1B, provides the United States with a warfighting capability through this decade; and, second, it lays the groundwork for total long-term strategic recovery by planning toward alternate basing for MX and the development of an advanced-technology bomber, ATB.

In my judgment, there is an urgent requirement for all five elements in the administration's proposal. The entire modernization package is required to insure a balanced and credible deterrent force into the next century. The support of both houses of Congress shown for the program in last year's budget indicates my judgment is widely shared.

There has been much debate on each element of the program and I would like to provide for you my views on those areas in the President's announcement that have an immediate impact on SAC—the B-1B and the ATB, the MX, and our network of command, control, and communications system. I will then comment on other developments and concerns in the strategic area.

B-1B/ATB

As to the B-1B/ATB, for some time SAC has advocated a dual-track bomber program to insure continuity of the penetrating mission into the next century, thus I fully support the President's decision to proceed with the B-1B and to pursue aggressively the development of the advanced technology bomber, or ATB.

A force of 100 B-1B aircraft serves four important purposes: First, it provides a much needed capability to narrow the growing disparity between United States and Soviet warfighting capabilities; second, it maintains the ability of our bomber force to penetrate enemy defenses, for penetrating bombers have unique capabilities that cannot be matched by any other weapon system; third, it provides the resources to enhance our conventional capability for worldwide force projection in the future; and, fourth, it transmits a clear signal to friend and foe alike that our resolve to restore the nuclear balance remains strong.

Some critics have argued that the B-1B will not be an effective penetrator and that its effective life is not worth the cost of the program. I reject that argument and would like to share with you my rationale for doing so:

It is important to note at the outset that the B-1B in the President's program has a capability to penetrate Soviet defenses that far exceeds the original B-1B of 1977. It has both more sophisticated defensive avionics and a reduced radar cross section. These technological advances are combined with low-altitude, high-speed penetration, defense suppression, cruise-missle dilution, and electronic-warfare tactics to enhance the B-1B's ability to counter Soviet defenses.

After detailed analysis, all national intelligence organizations have concluded that the B-1B will be able to effectively defeat the projected defensive threat well into the 1990's.

The B-1B is available in the near term when it is needed to perform the critical missions for which only a manned, penetrating bomber is suitable—for instance, damage assessment and strike and attacking mobile and imprecisely located targets. The B-1B is not an interim bomber: it is a system with the growth potential to incorporate new technologies and tactics which will keep it effective well into the 1990's and beyond.

One of the great advantages of a manned bomber is that it provides tremendous employment flexibility. There is no question among the military leadership that the B-1B is needed in the near term to preserve that flexibility. Whether it carries cruise missiles, gravity weapons and SRAM, or a mix, the B-1B will make a very significant contribution to deterrence and warfighting.

With the exception of the first 18 production models, all B-1B aircraft will be equipped from the beginning to carry cruise missiles as well as other weapons.

For a least the early part of its life, we at SAC believe that the B-1B can make the greatest contribution through employment as a penetrator. In that capacity it both insures continuity of the deep-penetrating mission, especially important against mobile and imprecisely located targets, and prolongs the penetrating life of the B-52 by allowing it to attack shallower and less heavily defended targets.

The flexibility of the B-1B will allow us to adapt to later changes in the threat by incorporating new ECM to prolong its penetrating mission or by taking advantage of its cruise-missile carriage to assume a shoot-and-penetrate or standoff role. Through these measures we can extend its useful life as a weapon system for many years, in much the same manner that the B-52 has adapted new tactics and missions for over 25 years.

From a strategy point of view, the decision to produce the B-1B now and continue with a follow on development of an advanced technology bomber is the most logical approach to our present problem of bomber force modernization. It simply makes good military sense to deploy the B-1B now and sequentially deploy the ATB as soon as its promising technologies are proven.

While the ATB technology holds great promise, it would be imprudent to put all our manned penetrator eggs in a high-risk technology basket. The ATB will provide a splendid capability when the technology is mastered. The capabilities of the B-1 are needed now. Together, these aircraft will force the Soviets to spread their defensive resources more thinly in an attempt to counter both systems simultaneously. The defenses the Soviets develop and deploy against one bomber will be much less effective against the other. In fact, a force mix of B-1B and ATB will enhance each system's penetrating capability, creating a multiplier effect in our bomber force.

It is my firm belief that sequential deployment of the B-1B and the ATB will retain for us that much-needed bomber penetration capability into the next century.

ICBM MODERNIZATION

The requirement for ICBM modernization is based on two separate and distinct problems—a significant and growing asymmetry in United States and Soviet strategic capability and a growing threat to the survivability of our fixed-based ICBM's. I would like to discuss each in turn.

The requirement for an advanced missle stems from the fact that our current systems are old and of limited use against important parts of the target structure.

As the hardness of Soviet ICBM's and other important military targets increases, there is an increasing need for a prompt hard-target capability within our retaliatory force. The MX is the only viable means of expanding our ICBM hard-target capability in the near future.

Some contend that the proposed deployment of MX in silos would create a decisive first-strike capability. This is simply not true. The quite limited deployment proposed will hold at risk only a small portion of Soviet strategic forces. Even this limited threat, however, could have a beneficial effect on the atmosphere for strategic arms reduction, especially if the option for further deployments is clearly preserved.

It is my belief that as long as the Soviet ICBM's remain almost totally secure in their silos, the Soviets will have no incentive to seek serious arms reduction agreements with the United States.

If we are to achieve a stable nuclear balance and maintain a strong deterrent, we must convince our adversaries that stability consists of neither side being able to gain the advantage by initiating a nuclear war and that we will take whatever measures are necessary to counter Soviet moves that undermine deterrence.

The initial deployment of the MX missile is a projection of U.S. resolve and a signal that we will not tolerate a strategic nuclear imbalance.

MX MISSILE IN MPS

The ICBM survivability issue remains a difficult one to resolve. For several years, national intelligence estimates have projected improvements in Soviet ICBM accuracy and throw weight that would enable them to destroy a significant portion of our land-based ICBM's in a preemptive first strike. That threat is very real.

To correct this growing vulnerability, the Air Force investigated several dozen basing suggestions and eventually proposed deploying the MX missile in the multiple protective shelter, MPS, basing mode. While the Air Force and SAC had recommended deployment of MX in MPS, I fully support the President's decision to begin the earliest possible deployment of the MX in silos while continuing to study alternate basing modes.

The decision to deploy the MX missile in silos is not an answer to the vulnerability problem but will provide us the considerable advantages of the missile itself. The prompt counterforce capabilities of the MX will provide a strong perceptual deterrent in any basing scheme.

Several basing concepts are under consideration—deep-underground basing, a new long-endurance aircraft platform; and defended deceptive or silo basing is the third and perhaps most promising ballistic missile defense, BMD.

The BMD research and development work projected can be done without violating existing treaty constraints. From among these options and any others that may arise during the investigation, a preferred solution will be selected by the summer of 1983, as Congress directed. Once the selection is made, we intend to pursue deployment as quickly as possible.

The critical point is that we must eventually deploy MX in a basing mode that insures the long-term viability of our ICBM force in the survival basing mode.

A critical element that underlies all these force modernization programs is an assured ability to communicate with our combat elements. Today the military capability of this Nation is bound together by a network of high technology, automated command, control, communications and intelligence, or C^3I, systems.

C^3I SYSTEM

An effective C^3I system must do two things: First, insure detailed, unambiguous warning and accurate attack assessment information is made available to the decisionmaking authorities; and, second, provide an enduring capability for command and control of forces worldwide through all phases of conflict.

As this committee is well aware, there is considerable doubt that our current C^3I systems are adequate to the task under conditions of nuclear warfare.

The President's commitment that C^3I be accorded the same high priority as the weapon systems insures that significant progress will be made toward correcting the deficiencies that exist today and improving our C^3I capability in the future.

Many of the programs recommended by the President provide for improvements in 1985 and beyond. The near-term programs to correct critical deficiencies that exist today are also urgently needed. We have recommended procurement of LF/VLF receivers for our bombers and groundwave emergency network, GWEN, survivable, CONUS-Wide communications net.

For the future, close attention is required to insure that our C^3I systems keep pace with our follow on weapon systems. The full, required capability will not be achieved quickly, but with effective management and the continued support of the Congress I am optimistic that our C^3I systems will be better able to support our national policy in the not too distant future.

Apart from the specific strategic initiatives announced in October, other OSD proposals will have a favorable impact on both our primary strategic mission and our ability to support other important missions.

As you know, SAC is the single manager for a very valuable national asset—our aerial refueling capability. Aerial refueling is the key to our ability to project and sustain U.S. power worldwide on short notice. Of course, our bomber forces have for years depended on aerial refueling to complete their missions, and in recent years SIOP tasking alone has stressed our available tanker forces.

AERIAL REFUELING BENEFITS

At the same time, more and more of our tactical and airlift aircraft have taken advantage of the benefits of aerial refueling. This has led to a serious shortfall in our ability to service all our potential customers adequately under many conditions.

We propose to alleviate these problems through a two-part program—replacing the current KC-135 engines with the more efficient and environmentally acceptable CFM-56 engine, and procuring additional KC-10 aircraft.

Re-engining the KC-135 will significantly reduce the number of SIOP sorties degraded due to lack of adequate refueling support and improve our ability to service tactical and airlift forces.

The KC-10, while not designated for SIOP support, will significantly enhance mobility by refueling airlift and tactical forces and performing airlift missions. This, in turn, will free KC-135's to further improve our SIOP effectiveness.

Virtually all of our military planning is heavily dependent on aerial refueling. Effective implementation of these plans requires the substantial increase in refueling capacity these programs will provide. I strongly urge full congressional support.

SPACE-BASED SYSTEMS

I want to say a few words about our space-based systems because I find it difficult to separate the future of the Strategic Air Command from the future of the Nation in space.

Already, we are reliant to a considerable degree on space-based systems for warning, navigation, weather, communications and surveillance—all support functions. Given this reliance, I believe we must lay the necessary groundwork to support possible future operations in and from space. The indications are that unless we make these preparations the Soviets will eventually be able to deny us use of space as a support medium and use it as a "high ground" to launch attacks on U.S. targets. If they should achieve superiority in space, they could well attain a decisive warwinning edge.

The President's modernization program indicates we are beginning to take the necessary steps to assure our future ability to operate in and from space. This trend must be maintained.

SAC is generally regarded as a nuclear command, and strategic deterrence is our primary mission. We also have important conventional missions, however, which are receiving increased emphasis as national guidance stresses mobility and conventional firepower projection.

With adequate tanker support, the SAC bomber force can provide rapid, massive firepower support for conventional operations anywhere in the world without reliance on forward bases or prepositioned materials. The recent Bright Star into Egypt exercise of the Strategic Projection Force decisively demonstrated this capability.

MARITIME MISSIONS

We also have the collateral maritime missions of minelaying and sea surveillance and reconnaissance in support of the Navy. With only minor B-52 modification, some crew training and a supply of advanced standoff munitions such as Harpoon or the medium-range, air-to-surface missile [MRASM] SAC could expand its maritime mission to make an important contribution to sea control. This mission could be performed, as others are, operating from U.S. bases not subject to attack during a conventional conflict.

I am proud of the contribution that SAC makes to national security and I am encouraged by the President's modernization program and the Congress' support of it.

READINESS PROGRAMS

It remains for me to comment on one final critical area—the readiness programs that provide the material we need to operate our systems and support the programs required to take care of our people. Congressional support for these areas over the last 2 years has been most commendable and I want to thank you for that support and urge you to continue it.

At present, we are still suffering from years of underfunding. Our flying hours program is not what it should be and we do not have the spare parts to support an expanded allocation of flying time; we have a very large backlog of real property items for maintenance and repair; and we continue to lose more good midcareer people than we can afford.

Despite these problems, we have been able to retain a high degree of readiness. Our operational readiness inspections, the toughest internal test to which any service element subjects itself, indicate we can perform our nuclear and conventional missions. The Bright Star exercise demonstrated our ability to project conventional firepower at long ranges, and there are signs that our actions to improve the situation are, with congressional support, beginning to take effect.

With last year's compensation package and the quality-of-life measures enacted or under consideration, we have reduced our losses of midcareer people. It will take time to train seasoned replacements for those we have lost, but stemming the outflow will make the problem manageable. We must continue these positive steps, including selective reenlistment bonuses to further increase retention.

The large increase in spare parts funding in fiscal year 1982 will begin to have an operational impact in the near future and the rate of growth of our backlog of required maintenance and repair will diminish as we apply the increased funding. It is apparent that we have turned the corner in solving readiness problems. It is imperative that we do not allow those problems to arise again.

In summary, the strategic initiatives outlined by the President will provide us with a deterrent force that is capable, credible, and stable, not only for the near term but well into the 1990's and beyond.

In its entirety, the President's program serves three important purposes: First, to narrow the growing strategic nuclear imbalance; second, it sets in motion the development of longer term forces needed to restore the strategic balance and protect our national interests; and, third, I believe our firm commitment to modernize and strengthen our strategic deterrent greatly enhances the prospects for an equitable and verifiable arms reduction agreement with the Soviet Union.

This Nation's greatest resource has been and will continue to be the moral courage of the American people and their determinaiton to remain strong and free. We have been entrusted with a grave responsibility, that of insuring that their aspirations are not denied because of adequate preparations were not made to defend ourselves.

SAC will do its part to see that the new systems and initiatives are fully implemented. Yours is the more difficult challenge—to resolve the many conflicing priorities necessary to keep the programs outlined on track and on schedule.

Thank you for tolerating me for this statement.

Senator **WARNER** [presiding]. Thank you very much, General.

[Prepared statement (classified) of General Davis retained in committee files.]

Senator **WARNER**. It is the powerful and strong statement we expect from you and it is very much needed as a part of our record so that we can utilize it in our deliberations with our colleagues when the issues arise.

I will now turn to my colleague, Senator Goldwater, to open up the questions this morning.

Senator **GOLDWATER**. Thank you very much, Mr. Chairman.

General, that was a very good statement. I just hope that our colleagues in the Congress will read it and pay attention to it, because, as you know, looking in the press and watching TV and listening to the radio, there is a concerted effort being mounted to once again shoot down our military ability and capability.

It is starting, I am sad to state, in the Congress and a lot of it will probably start in this committee. We just don't have people who understand this anymore.

I was just thinking last night that some of the young men I taught to fly 42, 45 years ago, are now pretty old men. There has been nothing much in the interim that would have given the newcomers the grasp that we older people have of this.

TITAN SILOS FOR MX MISSILES

Now, on this MX and silos, have you completely written off the use of the Titan silos for MX missiles, or Minuteman?

General **DAVIS**. Yes, sir. Logic would have told you if you are going to phase out the Titans, why not use those silos in preference to Minuteman. But the physical constraints make it significantly more expensive to put MX in the Titan rather than Minuteman silos.

If I may, on Titan II—and I am mindful of the session that I had with this committee last November on the issue of Titan II's when I expressed my concern that phasing them out could be seen as unilateral disarmament—I think there is a misimpression that Titan II's all stop operation on a certain date. They do not. They phaseout over a 5-year period as other systems phase in, so that there is a net gain in terms of deliverable weapons. However, due to Titan's high yield there is a net loss in terms of megatonnage.

As we go from a strategy of assured destruction to one which stresses war fighting capability (that is, the priority targeting of military and leadership targets), you need weapons that are more accurate—that give you a capability against Soviet military and leadership elements.

The systems that phase in, the air-launched cruise missile, 50 additional Minuteman III's will phase in faster than Titan II's phaseout, which will actually increase the numbers of weapons. There will be 10 Titan II's still on alert when MX reaches initial operational capability [IOC].

Senator **Goldwater**. That is a good answer. The reason I ask that, I was wondering if the Titan silos were too big for the MX, whether you could fire more than one MX out of a Titan silo, and the cost to modernize them would probably be too much, is that correct?

General **Davis**. That is right. Plus, if you decided to defend MX you need them placed closer together.

Our three Titan bases at Tucson, Ariz., Wichita, Kans., and Little Rock, Ark., are geographically very far apart. You can't possibly defend all three of them with the one defense system the current treaty allows.

Senator **Goldwater**. Thank you.

REFUELING

Now, getting to the subject which gets a little bit closer to my heart—the refueling question and the rapidity with which you reengine the Air National Guard KC-135, when do you think the first aircraft will be completed?

General **Davis**. The first National Guard tanker?

Senator **Goldwater**. Yes.

General **Davis**. We will finish the 18th special purpose airplane this June. The money provided by Congress last year wasn't quite enough for 28 additional sets of JT3D's. Incidentally, I am sure you are aware, that although the JT3D's give us a better capability, they don't meet environmental constraints. I will provide you an accurate answer for the record, but my supposition is that we probably will have the first airplane out by September or October.

And, as you know, we are taking the first three wings at places where they have problems—at Sky Harbor, at Nashville, Tenn., and at Salt Lake City, Utah. The JT3D certainly is an improvement over the J-57. But, the ideal engine, the one that will give the tankers the most capability well into the next century is, of course, the CFM-56. Don't get me wrong. The JT3D is a good engine but it should not be purchased at the expense of the CFM-56.

There has been no indication from the Congress that that is its aim.

Senator **Goldwater**. If you could supply a program for the record.

[The information follows:]

GUARD DC–135 REENGINING

The Air National Guard should receive their first aircraft modified with JT3D engines by the end of Jun 82. Three Air National guard units should complete JT3D reengining by Dec 82.

AIRCRAFT DELIVERY SCHEDULE (PROGRAM) (KC–135/JT3D REENGINING)

Program Management Directive, February 26, 1982.
Anticipated Contract, April 30, 1982.
First Delivery, June 1982.

	June	July	August	September	October	November	December	January 1983
Aircraft deliveries	1	4	4	4	4	4	4	3
Cumulative deliveries	1	5	9	13	17	21	25	28

Senator GOLDWATER. Now, we know that we can't stay with it, but National Guard outfits all over this country are besieging us with questions as to when their reengining will start.

General DAVIS. On the CFM–56, the first airplane is in for prototype this month at Boeing-Wichita. That airplane will finish its flight testing late this summer or early fall. After flight testing is complete, we will start airplanes in for CFM–56's and we will get the first out in 1984.

We will fold the Guard units in with the Active units. As a matter of fact, Billy Mitchell at Milwaukee will be one of the first units to get the reengined aircraft, as well as the units on the northeast coast at Pease and Bangor. These units will be refueling ALCM carriers and, therefore, will require more fuel offload capability.

The Guard units are going to be phased in based on both operational and environmental constraints. I met just a couple of weeks ago with about 12 of the State adjutants general and I assured them they were not going to go to the back of the line; as a matter of fact, they will come right in with the Active forces.

Senator GOLDWATER. I am very glad to hear that.

R. & D. ROLE IN SPACE

Now, I am glad that you are emphasizing space. Again, here is an area that we need a lot of help in, because, again, it is very difficult for Members of Congress to understand what we can do in space and when we can do it. We are not receiving enough money, in my opinion, to adequately assure us a continued research and development role in space. So, keep after that.

General DAVIS. Yes. The Air Force is looking at that. The Chief and the Secretary are both mindful of it. We are doing some very serious planning and I feel confident that we will have a plan of action over the next few months.

Senator GOLDWATER. Thank you.

ACE PROGRAM

Now, the problem of flying time continues to be a problem throughout the Air Force, but you probably have a bigger problem with it than any other of the units.

How is the ACE program coming along?

General Davis. The ACE program, A-C-E, meaning Accelerated Copilot Enrichment, wherein we use Air Training Command aircraft, either the T–38 or the T–37, to experience our copilots more rapidly so that they can upgrade to aircraft commander sooner. Flying time allocations affect this. I am happy to say that with congressional funding for full peacetime operating stocks and spares support with the 1982 budget and with full expectation that they will be fully funded in 1983, we will gain on the flying time.

The problem is, of course, leadtime. You funded in 1982 and with a 2-year leadtime on spare parts you really don't get well until 1984 on beyond. We won't see a significant increase in flying time until 1984. That is an unfortunate fact of life. It is an unfortunate circumstance of our industrial base, but the leadtime for spare parts is about 2 years. So, when you hear us expressing our concern about flying time—and you gentlemen have fully funded that spare parts account, and you can't understand why we are still complaining about flying time—that is the reason. But thanks to the help from Congress, and particularly this committee, we will get well.

Senator Goldwater. Thank you. I hope that we can continue an interest in an aircraft that you might make more use of than a fighter plane. I am thinking of something like a Lear jet, that they can now develop different noses; you can put B–1 simulation in it and there are several other aircraft of that type that we can purchase cheaper than we can purchase or refurbish the old 38's. I hope that we can keep looking at that.

General Davis. I would hope that the Congress will support the Air Force's proposal to go to a dual track pilot training and provide a multiengine trainer which will extend the T–38's life. You also increase the quality of training. With such a program perhaps we can increase the training and flying time of our Strategic Air Command copilots, B–52's, KC–135's, as well as the B–1B.

Senator Goldwater. I have one more question, Mr. Chairman.

I have asked the Secretary of Defense if he would favorably consider allowing the B–1 to appear at the Farnsboro Air Show. Is that thing bubbling along?

General Davis. To the best of my knowledge, it is bubbling, Senator.

Senator Goldwater. Don't stand in its way.

General Davis. Don't worry, I wouldn't dare stand in its way.

Senator Goldwater. Thank you very much.

Senator Warner. Are you going to fly it over there?

Senator Goldwater. I had mentioned that.

Senator Warner. I will be happy as chairman of the subcommittee to so order that it be done.

Senator Exon, we will turn to you now.

Senator Exon. Thank you, Mr. Chairman.

Gentlemen, I want to join my colleagues in welcoming you here. We are delighted to have you.

MX MISSILE

Let us talk a little bit about the MX missile, its deployment and where we are right now on this proposal. Are we making advancements with regard to a permanent basing mode that is supposed to come along sometime next year under the present plans?

Could you just basically tell me how we are doing in the overall area with regard to the deployment of the MX?

General DAVIS. Certainly, Senator Exon. It is a pleasure to be in from Omaha and talk to you once again.

The MX is progressing very, very well. We dedicated the integrated test facility at Vandenberg in late January. The facilities for first flight of the complete MX are well underway and the first flight will occur next January—January 1983.

Component testing is proceeding and is going very, very well.

The requirements to narrow the various Minuteman bases that are being looked at for the interim basing and Minuteman silos is coming to a conclusion and the Secretary of Defense will be making a decision in the not too distant future, and all of that is going well.

My fervent hope is that once that decision is made, the appropriate area named, and the congressional delegation as well as the State and local delegations are briefed, that we will get on with the deployment of MX.

The studies directed by the administration, by the President and by the Secretary of Defense, are proceeding. One of those final basing modes—the continuous patrol aircraft—had some restricted language put on it—and I am sure the administration will be talking to the Congress shortly on that. The defended deceptive basing concept is being looked at in some significant detail, as well as deep underground basing.

So, I would have to say from my point of view as the operational commander, the interim basing milestones are going very well.

The missile itself is performing very, very well and in fact from every indication I have, I am very, very optimistic and I think the program is proceeding very well.

MX ADVANTAGES OVER TRIDENT II

Senator EXON. General, could you tell me what are the advantages of the MX missile over the Trident II as far as land-based missiles are concerned, other than the fact that it is a Navy missile?

General DAVIS. I would hope, Senator, that I am objective enough to look at weapon systems, and as a taxpayer, as you are, and responsible for lots and lots of assets, that we can use whatever system is best in the circumstances. I don't think there is any question whatever about MX. It is no longer on the drawing board; it is a reality; it is a fact.

Component testing has proven it, that system will give us a single shot hard target kill capability against some targets that we don't possess today in any of our systems with assurance.

I look at, for instance, the INF talks occurring in Geneva and the President's proposal, which I thought was a very courageous proposal. The zero-balance option, there was a lot of scoffing at that proposal; nevertheless, I believe we were all proud of him for that proposal.

The Soviets have now responded, Senator. It is not the response we wanted but there is dialog going. The Soviets deal from a position of strength. I am convinced that if this Nation stays on course—and they are watching to see whether this country is really serious—I think that is the closest way to realistic strategic arms reduction. To stay the course means we stay the course with MX.

Senator EXON. General, I am seeking some answers here and I don't pretend to know all these things, but I assume that you do.

General DAVIS. I am not sure I know everything, but I will try.

TRIDENT II MISSILE

Senator EXON. I have been led to believe that it is possible the Trident II missile will give us the hard target kill capability that we need for 1989; is that an accurate statement?

General DAVIS. That is its design. For specifics on whether or not 1989 is still appropriate, you probably need to ask the Navy. But the missile will have hard target kill capability; at least that is its design parameter. It will have increased range over our earlier SLBM's, so that we can be competitive with the Soviet Deltas. It is a necessary upgrade of the submarine-launched ballistic missile leg of the strategic Triad. It is a must.

But the President, the National Security Council, the administration went all through a common strategic missile. It is like a lot of other things in Washington. The staff continues to perpetuate them. You are never able to successfully drive the silver stake through the heart of these. They have a life all their own.

We will certainly continue to look at them. But MX is near term. D-5 is not.

ABM R. & D.

Senator EXON. General, can you tell the subcommittee about antiballistic missile development and research, where we are and how successful do you think our programs are as of now? Do you need more money in the research and development area? The ABM is what I am referring to. Is that not likely to be a very realistic option if in the end we decide to place the MX in our present holes?

General DAVIS. No question about it, Senator Exon, ABM is a very key part of the defended deceptive basing concept.

General Tate and his people at Huntsville are very optimistic that they can produce a viable system. From my last conversation with General Tate, the program is proceeding at its best pace. Specific questions on specific milestones I would have to refer to General Tate, but my overall impression and my overall knowledge as a result of my discussions are that ABM is proceeding at a pace so that it can meet an IOC for the defended deceptive basing concept.

Senator EXON. Would you like to comment on that, General Adams?

General ADAMS. I agree, Senator. From what we have seen from General Tate's folks in terms of their progress—and they are doing quite a bit of work in the Kwajalein area using Minuteman missiles we fire to fine tune that capability—it has a way to go as far as basing scheme.

With regard to funding, I don't know. I know they are moving along.

I would agree with General Davis, I think, for more details you need to address that with the Army.

ABM TREATY

Senator **Exon**. Let me ask the following question, which is maybe the heart of what I am trying to get at: Assuming that the ABM treaty were to be abrogated tomorrow by the United States and the Soviet Union, both individually and simultaneously, to whom would the advantage go as you view our development of the ABM, and theirs, at this juncture?

General **Davis**. Of course, all of the details that go with that are subject to interpretation by the intelligence community and, of course, that would have to be covered in closed session, Senator.

From what I know, it is a fact—and I believe this is all in open literature, particularly in Aviation Week—the Soviets have done a lot of work on ABM, the Moscow ABM. The advancement on that technology, whether they are ahead of us, for an authoritative yes or no answer, (a) I don't believe we ought to give it in open hearing and (b) it should come from the ABM experts.

Senator **Exon**. I have further questions but I will wait for the second round.

Senator **Warner**. You may continue your questions for a few minutes.

MX MISSILE

Senator **Exon**. In the report that we received entitled, "The Organization of the Joint Chiefs of Staff," I quote from that and ask for your comment on it, General:

"Forty Minuteman III missiles replaced by initial deployment of the MX which will also be emplaced in Minuteman II silos." Do I take it from that that the decision has already been made that initial deployment of the MX will go in Minuteman III silos, period?

General **Davis**. No decision has been made yet, Senator. The narrow studies are about concluded. The decision is yet to be made by the Secretary of the Air Force and by the Secretary of Defense. That decision has not been made.

Senator **Exon**. This statement that I am reading from may be in error, but if it is, you are not aware of any final decision which has been made?

General **Davis**. No. I can state categorically that no final decision has been made.

Senator **Exon**. General, the Air Force claims that the interim deployment of 40 MX missiles in Minuteman II or III silos will not require any additional land, except the possible widening of roads and maybe some bridges and it won't require any additional land beyond that. Is that the Air Force's position?

General **Davis**. That is not only the Air Force's position, that is what logic tells you for the interim basing mode.

Now, if one jumps ahead and says that is the beginning of the defended deceptive basing mode, certainly logic cries out that you are going to need more land. I believe that is what you are getting at.

But for the interim basing mode, in existing Minuteman silos no additional land is required.

Senator **Exon**. Have you arrived at an approximate cost yet for implanting the MX when it is available in the Minuteman II or III silos?

General **Davis**. Yes, sir.

Senator **Exon**. I assume there is a difference in cost?

General **Davis**. There is no difference in cost between Minuteman II and Minuteman III. Although all details have not yet been worked out, MX deployment in Minuteman II silos would be more expensive than in Minuteman III silos because the Minuteman II silos would have to be deepened to accommodate the MX missile. Air Staff or Air Force Systems Command can provide cost details.

Senator **Exon**. There is no difference in cost?

General **Davis**. Not to my knowledge. The numbers are around $4.3 billion, but I can provide that for the record. I think that is the approximate dollar cost. Yes, $4.3 billion. The total cost in 1982 dollars, constant dollars, is $19.3 billion. $4.3 billion is for basing, so the other approximately $15 billion would be the cost of 226 missiles.

Senator **Exon**. No further questions at this time. Thank you, General.

Senator **Warner**. Thank you very much.

It is the Chair's intention to proceed with a series of questions in the open and then have a brief closed session. So, if Members desire to remain to ask questions of a classified nature, that opportunity will be given.

General, you were greeted this morning in Washington by the story entitled, "Pentagon plans to build MX warheads which Air Force and OMB don't want." I have prepared a series of questions on this same issue:

First, did you have an opportunity to read the article this morning in the Post?

General **Davis**. Yes, sir, in passing, very quickly.

Senator **Warner**. We will give you adequate opportunity to study it for the purpose of putting in other items in the record.

ADVANCED BALLISTIC REENTRY VEHICLE (ABRV)

What is your position on the decision to deploy the ABRV vice the 12A?

General **Davis**. The issue has been aired totally with the Air Force. ABRV, the advanced ballistic reentry vehicle, has certain very significant operational and safety advantages. A lot of what the press is able to gain and put in an unclassified way indeed turns out to be classified. I am aware of the ABRV plans. I think it is a step in the right direction. I don't see any operational limitation to its use on the MX. As a matter of fact, I see a lot of advantages and I would like to cover those in closed session.

We both are well aware that controversy sells newspapers. Maybe I am overstating it, but we may have a tempest in a teapot here.

Senator WARNER. Last night I drifted off about midnight looking at a television program of the continuing debate on the utilization of cruise missiles vice the MX. Maybe you saw the same show?

General DAVIS. No. It gives me nightmares.

Senator WARNER. My colleagues in the Pentagon espoused the philosophy we should substitue the cruise for the MX. I think it would be wise if we had something in the record with respect to your view on that issue, because it may well come up again in the course of our debate.

General DAVIS. Certainly. The cruise missile on any carrier is not a weapon system. A cruise missile must be carried by something. In the case of putting it on the B-52 or the B-1, it is a very effective weapon.

I think there needs to be a great appreciation for the fact that the cruise missile was a most concurrent program. By concurrency I mean we were doing actual flight testing while we were still in the R. & D. phase and, as a matter of fact, we received a production decision during this phase. It has performed well. It has not yet completed its full R. & D., but it will provide us a significant capability. It will help the penetration problem. It will help to compound Soviet defense problems, requires them to expend additional billions of dollars on defense.

But to say that it can replace MX, for instance, ignores the obvious. MX, Minuteman III, and Titan are all rapid response weapons. They arrive in about 30 minutes. Because of improved accuracy, MX will provide the hard target kill capability to place at risk the whole array of Soviet hard targets including their ICBM silos and their ever hardening command, control, and communications and it does it on a very time urgent basis.

ALCM's will be very effective against some hard targets. They are very accurate but they have the same problem as the bomber because they depend on the bomber to get them there.

By no stretch of the imagination, if indeed you want a deterrent capability and a strategic Triad, could you ever substitute ALCM for MX.

Senator WARNER. The Chairman of the Joint Chiefs of Staff touched off what may well be a very interesting reexamination of possible roles and missions. I commend him for his courage in speaking out as he closes out his distinguished career as chairman.

REORGANIZATION OF JCS

General DAVIS. Are you referring to the reorganization of the JCS?

Senator WARNER. Yes. A collateral issue may well be reexamination of roles and missions.

Now that we are looking at a land-based missile, MX, which may ultimately be complemented by an ABM system, do you as overall operator of that system have concern about the Army handling the ABM program and the Air Force handling the silo? Should we be looking at altering this biforcated managerial approach right now, to improve its cost efficiency or management effectiveness.

General DAVIS. At this juncture, Senator Warner, the cooperation, the joint nature of this venture, is going very, very well. Of course, it is dependent on the close working relationship between our Ballistic Missile Office and the Ballistic Missile Defense Office, and it certainly should be a thing that we give very, very serious consideration to. I am not sure that General Meyer would have a serious parochial argument over that issue.

I believe General Meyer would consider that item with a very open mind. I am less concerned about that issue than parochial service interest. I think people will do what is right to provide for the most effective defended deceptive basing concept, but we certainly should consider it and I am very confident that if the best way to go is for the Air Force to own it, that we probably will go that way.

Senator WARNER. Of course, the developmental phases can be handled by the respective departments, as you say, quite well.

If we go into an operational status where we have a series of these complexes across the United States, I am just concerned from the operational standpoint with the parallelism of the two services there. We may well end up in that mode with the Air Force owning it.

It is a very serious matter that we need to give very serious consideration to.

I am glad you have an open mind on it, because I do, too. After all, we all wear different colored uniforms, but it is for one purpose.

General DAVIS. Yes, sir.

ARMS CONTROL NEGOTIATIONS

Senator WARNER. We had testimony yesterday before the committee relating to the overall subject of arms control negotiations. One of the points which came out during the discussion was the belief that negotiations should be conducted in a patient atmosphere and away from the public attention. To what degree have you been involved in the current formulation of the procedure for the forthcoming arms control negotiations?

General DAVIS. I have had lengthy discussions with the team, with Dr. Rostow. We spent over a day together. I have spent 2 very full days with retired general, now Ambassador, Rowney. We have had extensive discussions, Senator. I have provided classified information and approaches through the JCS to Ambassador Rostow and to Ambassador Rowney on strategic systems and my comments as to certain negotiating positions, so we have been in extensive discussions.

Senator WARNER. You have been satisfied with your role in this?

General DAVIS. Yes, sir.

STRATEGIC POSTURE

Senator WARNER. Traditionally, we have asked this question. I think we asked it last year and certainly your predecessor addressed it time and time again, that is, a discussion of the degree to which the Reagan administration's strategic force modernization program is deepening or otherwise affecting the nuclear bathtub or window of vulnerability.

Would you care to provide again this year your views with respect to the actions that the United States is now taking to strengthen its overall strategic posture and how it affects this bathtub?

You have done that to some extent in your opening statement, but I want this question and answer in the record at this point.

General **Davis**. Yes, sir. No question about it, this strategic modernization program is the most comprehensive since the 1960's. It is a total program; it depends very much, of course, on a survivable basing mode for MX.

The redressal of the war fighting capability is taken care of in great measure by the continuation of the cruise missile program. I realize the past administration proposed and got the cruise missile underway and this administration increased the numbers. This administration and the Congress supports the B-1, which significantly improves our warfighting capability.

MX in a survivable basing mode, and the D-5 will help even more. I am mindful of the Titan and B-52 phaseouts. As a matter of fact, we will have a full hearing Friday on Titan II phaseout.

My overall best estimate—my overall conclusion—is that it is a significant improvement in our strategic capability.

Senator **Warner**. You mentioned D-5. Do you have any thoughts regarding the schedule on which that is proceeding?

General **Davis**. We have had, as you know some delays with the Trident program. I hope that is behind us.

I think 1989 is a reasonable date. I would have to ask the Navy program office to give refinements on that, but obviously we would like to have it sooner if we could get it, just like we would like to redress the balance as early as possible; but in view of the size of this year's budget, the deficit, I think we are proceeding apace and I believe the Soviets' realistic intentions are extremely effective, too, and the intent of this country to modernize is going to have a significant impact.

Senator **Warner**. If there are no further questions desired by members in the open session——

Senator **Exon**. I have one or two more questions, Mr. Chairman, If I might.

General, I will ask you this question first because I am fearful, and I anticipate that your answer will be less than revealing, and if it is I will understand that, but I want to ask you the question in open session and give you a chance to reply.

SAC PRIORITIZATION

If you were confronted with the need for budget reduction for the Strategic Air Command in terms of billions of dollars over a 2-year period, where would you recommend that these reductions be made to cause the least risk to our deterrent? I am talking, of course, about our prioritizing any possible budget cuts. Where do you think they might be the least painful, if necessary?

General DAVIS. Obviously, in my view, the program is balanced. I think the Secretary, the Chief and myself have a series of priorities and those are the people programs, because without the people you don't have a realistic program.

Strategic modernization enjoys an equally high priority. Then comes readiness and modernization; then comes improvement of our tactical forces and, last, comes force structure.

I believe the President has stated it; the Secretary of Defense has stated it; the Deputy Secretary of Defense has stated it; the Chief and my Secretary and the Chairman of the Joint Chiefs of Staff have stated it. I don't believe this country can afford to cut any of these strategic programs.

Senator WARNER. Is that a clear answer?

Senator EXON. Yes. That is the answer I anticipated. I appropriate the general's frankness.

WINDOW OF VULNERABILITY

Getting back to the window of vulnerability, you have testified, General, that you think we are making significant strides in almost all areas. I, therefore, can only assume that you are saying that in the years ahead, with the program presently in place, we are starting to close the window of vulnerability; is that a fair assumption from your testimony?

General DAVIS. With the B-1B and MX the answer is yes.

Senator EXON. Were you not disappointed—and keenly so—with the decision of this administration to cancel at least for the time being a multiple basing mode for the MX which I have been led to believe over the years in testimony in front of this committee that a multiple protective structure MX basing mode was the basic key to closing the window of vulnerability?

General DAVIS. My answer this year is, as it was last year, Senator, yes, I was disappointed. That was the way to begin to solve the vulnerability problem sooner. The fact that you deploy the missile helps you with your deterrent capability.

The Soviets know that. Cancellation of the mulitiple protective shelter basing mode, the 4,600 sites with 200 missiles shuttling among them, was a disappointment because we believed it solved the vulnerability problem sooner. The President did not.

We are now proceeding to manufacture the missiles, to deploy the missiles on an interim basis and get on with solving the vulnerability problem. Under any circumstances, you weren't going to get an instant solution. I was certainly disappointed but I think the precepts of the overall program are such—and I will say this year as I said last year—that I support the President's program. You don't get everything you want. You know that and I know that.

Senator EXON. I thank you, General.

I thank the Chair.

Senator WARNER. At this time the subcommittee will go into executive session.

The clerk will inform the chairman when the room is cleared.

[Whereupon, at 9:18 a.m., the subcommittee proceeded in executive session.]

EXECUTIVE SESSION

The subcommittee proceeded in executive session at 9:22 a.m., Senator John W. Warner (chairman) presiding.

Senator WARNER. General Davis, at this time the subcommittee will receive in executive session the classified statement which you have submitted. It will not be necessary, of course, for you to go through that verbatim, but I felt that in view of some of the questions asked this morning, you might want to supplement your response to those questions in addition to what is contained in your statement.

TITAN II PHASEOUT

General DAVIS. As you know, Senator, we will have a separate hearing on Friday on the phaseout of Titan II, and I think that hearing will be revealing and put in context the fact that the phaseout is a dynamic process.

There is a natural impression by everyone when talk about phasing out weapon systems that all of those deliverable systems go out on a date specified. That is not the case.

The Titan will phaseout over a 5-year period. If the programs go as I know we all fervently hope they will go, we phase in significant additional ALCM's; we phase in Minuteman III's, 50 at Malstrom; and by the time that 10 MX's are on alert in Minuteman silos, there will still be 10 Titan II's on alert.

Although there will be a net gain in terms of deliverable weapons, you are going to drop some megatonnage because Titan has a big warhead no question about it.

However, the qualitative aspect of the President's program is not a plus. The qualitative aspect of the MX's, the qualitative aspect of additional warheads as a result of Minuteman III's, the qualitative aspect of additional air-launched cruise missiles. That is why I see the President's program as a net plus.

LABORATORIES AT LOS ALAMOS AND SANDIA

Senator WARNER. General Davis, I had a very interesting inspection trip to the complex of laboratories operated by the Department of Energy, namely, Los Alamos and Sandia, and I came away with several concerns.

[Deleted.]

Have you examined that option?

General DAVIS. Certainly. You are concerned about [deleted] in addition to the other safety features. One of the pluses for the ABRV, in addition to a net saving for this country of a very valuable commodity [deleted] is the growth capability that the ABRV has. We have lagged, unfortunately, in our weapon modernization. It is not that the labs have not been at work; it is just the fact that we have not—we, this country—have not put the dollars into modernizing those weapons.

I would like to defer to General Adams at this time, who spent a long time in the Defense Nuclear Agency and can give you some of the details on the new aircraft weapons.

Senator **Warner**. General, what I specifically would like to have provided for the record is the advice from the Strategic Air Command as to what systems in order of priority should be phased out. Second, I put forth a thought with the laboratories along these lines and I would like to have your comment on this thought. It is controversial so you can just call it my idea, but I can take the heat.

As we look at the overall capability of the United States to modernize these systems and at the same time to install the new systems, there is an inadequacy, particularly in the Pantex facility which leads me to the thought that perhaps in the modification program that we wouldn't try and modernize the whole inventory but that we would take a percentage of the inventory, say, [deleted].

I hope that you will have an opportunity to put carefully in the record your evaluation of, one, the order in which we might retire wholesale; two, the advisability or not of modding only a percentage of some of the existing weapons.

General **Adams**. Let us go back to the Grand Forks incident and even before that, [deleted].

We have within the command taken some very aggressive steps, going all the way back to 1978, with regard to removing [deleted]. We had [deleted] in 1978. We have reduced those now. This year, as of October, 1982, we will have only [deleted].

We feel—and I say this both from a Strategic Air Command point of view and, more importantly, from a weapons or war planner's perspective—we need that [deleted] weapon [deleted] as a [deleted].

It provides a perceptual deterrent [deleted] in my view, having the large weapon on the B–52. We have reduced the numbers by more than 50 percent. We have taken it down to a level that we think we should not go below, although we are prepared to do that.

We have replaced it with the B–61 weapon which is [deleted]. It is about [deleted] versus the [deleted] I mentioned before.

We have the same accuracy with it but we don't have the same kill capability.

Coming down the line is the [deleted].

To go back and mod the B–28, as I am sure Don Kerr told you, is a very expensive process; it takes almost as long to go back and retrofit or mod the B–28 as it will to start from scratch with the B–83, which is well on its way.

How much is enough, I guess, is in the mind of the guy who wants to spend the money.

In addition to those initiatives that have been taken with regard to [deleted].

We package them up in the same clips, if you will. [deleted].

We are very careful about the procedures for practice alert and starting engines. We have better aircraft positioning and firefighting capability. They are isolated from the other aircraft to enhance that.

General Davis has had a continuing dialog with the Chief of Staff and with General Leif, the Air Force Inspector General, IG, with regard to assuring the Air Force, even assuring the OSD community, that we have taken every step that we feel we can with regard to safeguarding [deleted].

There is a quick fix to the [deleted]. That is also in work at the present time.

[Additional information supplied for the record:]

RETIREMENT AND MODIFICATION OF AIRCRAFT WEAPONS

Senator **WARNER**. I hope you will have an opportunity to carefully put in the record your evaluation of, one, the order in which we might retire wholesale; two, the advisability or not of modding only a percentage of some of the existing weapons.

General **DAVIS**. As General Adams mentioned in executive session, we have [deleted] but this alone will not [deleted]. None of the weapons in our stockpile today [deleted]. Realizing this, we have recommended a very aggressive weapons modernization program to the JCS that will, [deleted].

We hope to replace all the old [deleted]. To do this, the current B83 production schedule must be increased. The [deleted] will be modified [deleted]. Until all this is done, however, we should modify the [deleted]. Unfortunately, the large majority of the [deleted]. The matrix below establishes the priority in which our older weapons should be retired. Let me emphasize that these retirements are predicted on the receipt of sufficient B83's to meet our [deleted].

Weapon:	*Yield (KT)*
B28 Y1 (Type 83 PIT)	1,100
B43 Y1	1,000
B28 Y2	350
B28 Y5	1,450
B28 Y3	70
B53 Y1	9,000
B28 Y1 (Type 93 PIT)	1,100

Senator **WARNER**. At what point will that program be completed?

General **ADAMS**. As soon as we can get them in and out of the mod, and I would say we should have that done with the remaining [deleted] weapons we have on alert within the next 2 years.

Senator **WARNER**. Do you see any advantage in just doing a fraction of the inventory in order to relieve the pressure?

General **ADAMS**. Yes; we can take it down to just the alert force. It probably will not be cost effective to modify the follow-on force, the airplanes that are generated in a national emergency. We feel our procedures are sufficient and safe enough to safeguard against a disaster.

Senator **WARNER**. You are far more aware than I of the sensitivities of this country on this issue. It is unthinkable that we can have an accident.

ABRV

We are going back to the question of the ABRV. Will you put a comment on that in this classified session?

Before we get into that, it is rather interesting—you said the [deleted]. Of course, General Davis, in open session said we have no hard target kill.

General **DAVIS**. It is your single shot probability of kill.

Senator **WARNER**. I am talking about semantics. Maybe you want to go back and polish up that statement a little bit. Go ahead. We are on the question of the ABRV.

General **DAVIS**. The ABRV, of course, has a growth capability to [deleted] which gives you a hedge if you don't get the programed accuracy. The knee of the curve is around [deleted]. The initial ABRV will be deployed at [deleted] and with the programed accuracy—and we have every confidence that it will have that accuracy—that yield will provide the capability we need. More importantly, of course, it is a new system with all the safety features and it uses considerably [deleted]. The speculation is that there was argument between DOD and the Air Force. That is not so. We needed to know all of the features and I feel we know all the features.

I supported the ABRV, particularly for the [deleted] and the growth capability which the Mark 12A does not have.

Senator **Warner**. General Adams, do you have anything you want to put in?

General **Adams**. I agree with General Davis, that again the Mark 12 and 12A are late 1950's, early 1960's technology. The ABRV will be 1980's technology when it comes on the street. Again, the safety feature folds into that. It is a much safer weapon; [deleted].

It is a hedge against some problems that we have today in the older weapons.

Senator **Warner**. I think those are all the questions that I have right now.

Unless there is something further you gentlemen wish to add, we will now close this first session of our hearing with you, General Davis. Of course, we will submit questions for the record.

General **Davis**. Thank you very much, Senator. Thank you for the opportunity.

[Questions with answers supplied follow:]

Questions Submitted by Senator John W. Warner

ABRV DECISION

Senator **Warner**. General Davis, do you support the Administration's decision to deploy the advanced ballistic reentry vehicle, ABRV, warhead on the MX missile instead of the Mark 12A?

What are the principal considerations influencing your position?

General **Davis**. We support the decision to change the MX baseline reentry vehicle [RV] from the MK 12A to the ABRV. The ABRV will provide the latest in RV and fuzing technology, enhanced nuclear safety features and will eliminate the risks of having two ICBM systems dependent on a single RV/warhead design. Of course, the warhead for ABRV is also a more efficient user of [deleted], providing more [deleted].

The primary reason for our support of the ABRV is that it offers the potential for higher yield [deleted] as a hedge against the possibility that the MX might fail to achieve its design goal accuracy.

ABRV YIELD

Senator **Warner**. Is it the possibility of increasing the yield of the ABRV substantially an important consideration from a targeting viewpoint?

General **Davis**. Yes, SAC has consistently supported the ABRV/[deleted] with a yield of [deleted]. Its higher yield, vice the [deleted] MK-12A or the [deleted] ABRV, provides a greater capability against hardened targets than current weapon systems. As an example, today our ICBMs cannot effectively hold at risk Soviet fourth generation ICBM silos or some of the very hard leadership bunkers. The [deleted] ABRV gives us improved hard target kill capability while providing a hedge against the possibility that future ICBMs might fail to attain their design accuracy goals.

POTENTIAL ABRV WEIGHT PENALTIES

Senator **Warner**. Does the additional weight of the ABRV impose significant operational penalties that offset advantages in yield that it may enjoy?

General Davis. There is some concern that the heavier ABRV, when combined with weight growth in the MX booster, could impose operational penalties. We are studying the matter in conjunction with the Air Staff and the Ballistic Missile Office, but the results thus far are inconclusive. At this point the problem does not appear to warrant reevaluation of our preference for the ABRV.

CBO REENGINING STUDY

Senator Warner. General Davis, as the operational commander with responsibility for the nation's strategic air refueling assets, I assume you have given careful study and consideration to the issue of the optimal means of extending the life and increasing the performance of the KC-135 tanker force. The Congressional Budget Office contends that some $5.5 billion could be saved in budget authority over the next five years by reengining a portion of the fleet with JT-3D engines resulting in a reduction in performance during the 1980s of only 5 percent below the Administration option of reengining the entire fleet with CFM-56 turbo-fans.

Would you comment in detail on your assessment of this alternative?

General Davis. From a brief review of the Congressional Budget Office (CBO) Study, it appears that study has understated total tanker requirements by approximately 400 tankers in the 1988 to 1994 time period. SAC, as the single tanker manager, has studied the future tanker requirements in conjunction with AF Studies and Analysis, and we recommend KC-135/CFM-56 reengining as the optimal approach to reduce the tanker shortfall.

The CBO study states: tanker requirements will decline substantially when the B-52 role changes to "standoff." This did not consider positive control orbit time or positive control return to the U.S. When these two factors are considered, the tanker requirements remain unchanged for B-52 support. Additionally, the study used a force sizing based on a relatively small projection force deployment to the Persian Gulf. Our air refueling requirements are based on the need to deploy our tactical air forces and army units to the NATO theater with the time period in our war plans.

The understated tanker requirements skews the results of the CBO study and leads to an incorrect conclusion. Only 64 percent of requirements are met with JT3D reengining versus the stated 95 percent. To meet future requirements, the Air Force must continue with CFM-56 reengining.

THE NEED FOR A PROMPT RETALIATORY CAPABILITY

Senator Warner. General Davis, would you comment, from the standpoint of a strategic targeter, on the degree to which the SIOP target base is insensitive to the timeliness of our retaliatory attack? In other words, to what degree does the effectiveness of our response to a Soviet first strike depend upon our having weapons in the inventory capable of reliably attacking the range of Soviet hardened and unhardened targets in a prompt fashion.

Given your response, how far can we go in trading ICBM warheads for air- and sea-launched cruise missiles and other bomber-delivered weapons?

General Davis. In the planning process, we are very sensitive to the time factor in our targeting. The value of military facilities in particular tends to decrease over time. For example, Soviet ICBMs are time sensitive targets since all 1400 Soviet ICBMs are not likely to be launched in a preemptive strike. Those not launched because of employment policy or malfunction at execution will remain as threats to the United States. Addtionally, the [deleted] Soviet silos poses an important [deleted].

Considering these possibilities, it is essential that we have prompt weapon systems—our ICBMs—with the accuracy, yield, and range required to place Soviet silos and launch control facilities at risk. We must insure our systems are so structured that the Soviets cannot perceive that their nuclear threat to the US is afforded sanctuary status, either by time or distance.

We rely on a wide range of weapons to meet our targeting objectives. Although air- and sea-launched weapons certainly make an invaluable contribution to our deterrent posture, only the ICBM can meet our targeting requirements against that certain set of hardened Soviet targets requiring a prompt response.

OFFENSE VERSUS DEFENSE

Senator Warner. General Davis, last year at about this time your distinguished predecessor, General Ellis, advised this committee that it was his judgment that given the fact that insufficient resources would be made available to meet all his important requirements, he would assign a higher priority to fulfilling his needs for offensive weaponry rather than diverting some of the funds that would otherwise go toward our retaliatory, that is, deterrent, capability toward strategic defensive investment. Do you concur, and if so, what do you recommend be done about fiscal year 1983 requests that would go for defensive investment?

General **Davis**. I believe the fiscal year 1983 budget represents a prudent balance, Senator Warner. I concur with General Ellis' judgment that our first priority must be strategic offensive systems capable of deterring nuclear attack and prosecuting the war should deterrence fail. The fiscal year 1983 budget moves us in that direction. However, it also makes sense to limit damage to the nation to the extent possible if nuclear war should occur despite our best efforts to deter it. And, in fact, a reasonable level of defensive capability creates uncertainty and strengthens deterrence. The defensive element in the deterrent equation has suffered from neglect, and the fiscal year 1983 steps are appreciated.

MEANING OF ENDURABILITY

Senator **Warner**. General Davis, what is your understanding of the definition or standard being applied by the Administration in its use of the term "enduring" employed in the context of modernizing our strategic command, control and communications, C^3, network?

Does it mean improving the system so as to increase the probability that it will be capable of performing its mission 30 minutes into an attack, 24 hours following a strategic exchange, or some longer period measured in days?

Do you think that such a goal is achieveable, given present resources, and how important is its attainment to you?

General **Davis**. The thrust of the Administration in developing an "enduring" capability is to provide a capability to engage in a prolonged conflict [deleted]. The FYDP programs will greatly enhance enduring connectivity, although they will not correct all the major shortfalls. This is particularly critical in the area of [deleted].

Achieving [deleted] must be our first priority. However, careful consideration of reliability and autonomous operation capabilities during the acquistion phase will provide a first step in achieving the endurability we need.

MX IN SILOS

Senator **Warner**. General Davis, how would you characterize the value added to the US strategic forces and the President's program for modernizing them represented by the MX? Does your answer differ if the MX is deployed at least temporarily in "vulnerable" Minuteman silos, as opposed to some ultimate long-term survivable basing mode?

General **Davis**. Regardless of the basing mode, the MX represents an important, essential step in modernizing our strategic forces. With MX [deleted] and partially redress the current asymmetry in this area. The addition of the MX to our strategic inventory will also complicate Soviet offensive and defensive planning and increase their costs. Resources devoted to Soviet survivability are resources not available for Soviet force modernization or expansion. Failure to modernize our ICBM leg would eventually drive us to a DYAD, allowing the Soviets to concentrate on ways of defeating our SLBMs or bombers.

We are committed to, and rigorously searching for, a survivable basing mode for MX which will greatly enhance the deterrent value of our strategic forces. But, regardless of the basing mode, MX and ICBMs in general, offer a great deterrent. MX in silos will provide unique and valuable operational and warfighting capabilities due to its range, responsiveness, and accuracy. However we base the MX, it provides us an essential capability while transmitting a clear message of resolve to our allies and enemies alike.

ALTERNATIVES TO MX

Senator **Warner**. General Davis, have you looked carefully at the possible alternatives to the MX system that might be acquired at significant savings when compared with the projected outlays for interim deployment of MX, let alone long-term options?

General **Davis**. As you know, the Air Force has accomplished numerous studies of potential ICBM basing modes and new missiles. For a given level of capability, MX has consistently proven to be the best option. I believe the current missile development program, with interim deployment in silos prior to selection of the long-term basing options, is the most cost-effective and operationally sound program available.

AIRS GUIDANCE FOR THE MINUTEMAN III

Senator **Warner**. General, what would be the operational penalty in terms of targeting flexibility and deterrent value of simply retrofitting the Minuteman III force with the Aries guidance system and, to the degree that it has already not been done, with MK 12A warheads compared with a deployment of 100 MX missiles with ABRV warheads?

What would be the difference in cost of the above?

General **Davis**. Senator, the penalty would be threefold:

First, the deterrent value of the Minuteman option would be less than the MX option. One hundred MX in Minuteman III silos would give us 700 more warheads than the MM III/AIRS/MK 12A option.

Second, because AIRS is heavier than the current Minuteman III guidance system, there would be a substantial difference in range and footprint capability between the two options. The range of an MX/10 ABRV system is [deleted] greater than a Minuteman III/AIRS/M12A system. In addition, the MX footprint can cover a larger geographical area than can Minuteman III.

Third, because of the design of the Minuteman III fourth stage rocket motor, the AIRS guidance system would not achieve the same accuracy on Minuteman III as it would on MX. The result would be about a [deleted] in single-shot hard target kill capability with the Minuteman III option.

In my professional military judgment, MX with the ABRV warhead is the better option for meeting our future deterrent requirements.

We at SAC do not have firm cost data on the AIRS guidance on Minuteman III at this time. I would ask you to defer your question to Air Staff or Air Force Systems Command.

SOVIET ACTIONS

Senator **Warner**. General Davis, you have been asked on numerous occasions to discuss the degree to which the Reagan administration's strategic force modernization program was deepening or otherwise affecting the nuclear "bathtub" or window of vulnerability in which we find ourselves vis-a-vis the Soviet Union. Would you discuss in detail specific actions that we see the Soviet Union taking, or not taking, as the case may be, with regard to their own strategic forces that might have an influence upon that calculation?

General **Davis**. Since the early 1960s, the Soviet Union has pursued a coherent program to attain military superiority over the United States. In recent years, military research and development alone has accounted for almost one-fourth of Soviet defense expenditures, or almost three percent of gross national product. This massive military development effort supports the Soviets' doctrinal call for the acquisition and maintenance of superior warfighting capabilities, to include major investments in strategic nuclear forces. Our continuing analysis of future Soviet strategic modernization trends shows no significant deviations from the window of vulnerability described in the latest SAC comparative force analysis.

Questions Submitted by Senator Strom Thurmond

ICBM MEGATONNAGE

Senator **Thurmond**. General Davis, as the Titan II missiles are retired and the 40 MX missiles replace Minuteman missiles, we will experience a large drop in total megatonnage?

What will be the actual increase in the number of warheads above?

General **Davis**. There will certainly be a drop in total ICBM megatonnage as the operation you describe is completed. There is a net gain as the MX replace Minuteman, but considerably less than the loss associated with Titan deactivation. However, I cannot overemphasize the fact that total megatonnage is a very poor measure of effectiveness for today's strategy or any strategy we are likely to adopt in the future. The gain in overall capability is substantial, and the proposal thus has my full support.

In answer to your second question, if the MX replaces Minuteman II, there will be a net gain of 308 weapons. If MX replaces Minuteman III, the net gain is 228 weapons. These figures include the loss of the 54 Titan weapons.

REQUIRED ICBM ACCURACY IMPROVEMENTS

Senator THURMOND. General Davis, what are the actual increases in warhead accuracy that will give the United States a credible war fighting capability?

General DAVIS. Senator, the accuracy required to achieve the capability we need is a function of warhead yield. With the [deleted] MX 12A warhead, an accuracy of about [deleted] would be required to provide the minimum satisfactory hard target probability of kill. With a [deleted] ABRV, the accuracy required to give us this same minimum capability would be about [deleted].

C^3 KEEPING PACE WITH WEAPONS

Senator THURMOND. General Davis, are the improvements in C^3 keeping pace with the deployments of our new systems to allow us a survivable C^3I in the event of a first strike?

General DAVIS. Senator Thurmond, your question addresses the heart of the matter. We must have C^3I systems with the survivability and endurability required to support our future modernized weapon systems. The findings of the OSD Strategic Connectivity Review indicated serious C^3 shortfalls in our ability to [deleted].

Correcting these shortfalls has become a national priority. When fully implemented, and given a timely decision by the NCA, the programs in the FYDP will greatly enhance our capability to [deleted].

DEPRESSED TRAJECTORY SLBM

Senator THURMOND. General Davis, what is the survivability of our B-52 bomber force under a low trajectory SLBM first strike?

General DAVIS. [Deleted.]

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

SAC MARITIME ROLE

Senator NUNN. General Davis, last year I asked you about what role can or should SAC play in respect to maritime missions to assist the U.S. Navy. Deputy Secretary Carlucci testified this year that the Air Force will have additional roles in support of the so-called maritime strategy.

What is your understanding of the so-called maritime strategy and has SAC been assigned any additional missions under this concept?

General DAVIS. Strategic Air Command's maritime responsibilities have not changed since 1950. They consist of interdicting enemy sea power, conducting antisubmarine warfare and protecting U.S. shipping, and aerial minelaying.

Although no additional roles have been assumed, advances in weapon technology provide the potential for increased capabilities. In addition to our current missions, manned bombers, appropriately armed, could launch effective long-range strikes against Soviet Naval facilities and ships at sea. In fact SAC is currently investigating the potential use of B-52s as delivery platforms for stand off air-to-surface missiles such as the Harpoon and the Medium Range Air-to-Surface Missile (MRASM) against Soviet surface vessels. With modifications and crew training, B-52 aircraft could be used to provide sea lane control from U.S. land bases. Used in this role, SAC forces could provide near-term support for the Navy in its drive to regain and maintain maritime superiority.

MARITIME POTENTIAL

Senator NUNN. General, what do you view as the appropriate SAC role in the above area and what are your constraining factors?

General DAVIS. [Deleted.] However, the inherent capabilities of the B-52 (long range, high loiter time and large load carrying ability) could be used to improve our national maritime power if the aircraft were properly configured. [Deleted.]

Current funding guidelines hinder our ability to procure such specialized equipment if they can not be applied to our primary nuclear mission. However, in today's environment I believe SAC could take advantage of the B-52's worldwide capability and complement the overall maritime strategy of the United States. With the proper funding and support, the B-52 can attain a real maritime interdiction capability.

B-52D MARITIME ROLE

Senator **Nunn**. General Davis, what role can or should the B-52Ds be given in the above respect while they are still part of the SIOP and when they phase out?

General **Davis**. The B-52D will continue to perform its SIOP and collateral missions up to the point of its eventual retirement. Although its primary role is as a SIOP penetrator, the D model possesses the ability to effectively conduct such varied misisons as aerial minelaying and sea reconnassiance and surveillance. However, the continually increasing cost of supporting the B-52Ds maintenance requirements has contributed to the decision to retire the aircraft by fiscal year 1983.

RETAINING B-52D

Senator **Nunn**. General, should the B-52Ds be retained in the force structure to assist in this maritime role?

General **Davis**. Retention of the B-52D for maritime use would require extensive weapon carriage and sensor modificaions. The B-52D, with aerial refueling and forward basing, has the necessary range but lacks the sensor sophistication to distinguish enemy ship from friendly ships at ranges beyond enemy defenses. Modifying the B-52D model and retaining it solely for a maritime role would not be cost effective.

WEAPONS NEEDED FOR MARITIME MISSION

Senator **Nunn**. General, what weapons should be developed for sea-power interdictions and what is the program now?

General **Davis**. [Deleted.]

POLICY CHANGES

Senator **Nunn**. General Davis, have there been any changes in the Nuclear Weapon Employment Policy and/or the Joint Strategic Capabilities Plan as a result of President Reagan's view and the new strategic modernization program announced last October, 1981?

General, what are your constraining factors in the above respect?

General **Davis**. Both the NUWEP and JSCP are currently under review and I am sure any new Presidential directives will be incorporated into these documents. I should point out that the NUWEP and JSCP should not change as a result of modernization programs; rather, forces and capabilities should be improved to meet the objectives and strategies outlined by national guidance.

Members of my staff are developing inputs for the Terms of Reference, Nuclear Weapons Employment and Acquisition Master Plan being written by OSD. This long range plan will help prioritize the acquisition of major strategic weapon systems and capabilities which will support the national guidance.

As for the second part of your question, regarding the constraining factors in meeting national guidance, my opening statement addresses the major constraints. To summarize, the aging B-52s will have difficulty penetrating improved Soviet defenses in the future. Our current ICBM's are becoming increasingly vulnerable and do not provide the counterforce hard target kill capability required to meet the current guidance. In a period during and after a massive nuclear exchange, our current C^3I capabilities are likely to be severely degraded. All of these constraining factors lead to a strategy/force mismatch. The President's modernization program will be an important step in correcting the situtation.

Senator **Nunn**. General, what guidance have you received as Director of Strategic Targeting relative to the planned use of nuclear land-attack cruise missiles employed on submarines?

What is your view as the appropriate missions for the above weapons?

General **Davis**. [Deleted.]

MX IN SILOS

Senator **Nunn**. General, what policy change or guidance have you received with the decision to deploy the initial MX in existing silos? What changes are necessary, in your view, or will we view these missiles in the same way we view the current Minuteman deployment there?

General **Davis**. In response to the first part of your question, Senator, nuclear weapon employment policy and guidance did not change in conjunction with President Reagan's decision. However, I said in my statement, our current force structure is inadequate to execute those strategies.

With regard to the second part of your question, our existing employment strategies do not require fundamental changes if the current strategic modernization program remains intact. Theoretically, employment policy should drive our acquisition and deployment decisions rather than the reverse. The ICBM force supports the strategy by providing the best prompt response to an enemy attack. MX and Minuteman III will be matched against the most appropriate targets. The silo-based MX is a step in the right direction in providing an improved counterforce capability. While the interim MX basing mode does not resolve the survivability issue, the MX weapon system will significantly increase our ability to attack hard targets which supports the current nuclear weapon employment guidance. Regardless of survivability, MX will provide deterrence and warfighting capabilities that our forces do not currently possess.

VALUE OF ABRV

Senator NUNN. General Davis, what is your understanding of the need for the ABRV warhead and what does it do for SAC in terms of meeting the targeting requirements that the Mark 12A does not accomplish?

Would the Mark 12A program as originally planned and presented last year provide the capabilities you need?

General DAVIS. The ABRV offers a number of advantages over the MK-12A. The ABRV is a more efficient user of special nuclear materials [deleted]. It contains the latest in re-entry system technology, has an improved (interactive) fuze, and additional safety features such as insensitive high explosives. Therefore, I support the decision to use the ABRV as the MX baseline. An important advantage to SAC of the ABRV/[deleted] is that it offers the potential to increase warhead yield to [deleted.] This would increase our capability against hard targets or serve as a hedge against the possibility that the MX does not achieve its design accuracy of [deleted] CEP.

The MK-12A will meet target damage requirements if the MX design accuracy of [deleted] is attained. However, failure of MX to meet its design CEP would seriously reduce MK-12A effectiveness against hard targets.

MX UNCERTAINTY

Senator NUNN. General Davis, does the uncertainty surrounding the MX change the approach to the warhead for the MX?

General DAVIS. No, Senator Nunn. Regardless of the final decision on MX basing, the ABRV will remain the preferred candidate. Its advanced technology, improved fusing, safety features and potential for increased yield make it as modern and capable as the MX delivery system.

D-5 HARD TARGET CAPABILITY

Senator NUNN. General Davis, in your role as targeting director, what capabilities would a 20-boat force with the appropriate number of D-5 missiles give you in terms of providing the hard-target kill coverage necessary?

General DAVIS. [Deleted.] My Joint Strategic Targeting staff has not been provided definitive characteristics of the Trident D-5 missiles and therefore cannot answer the question.

D-5 COVERAGE OF THE HARD TARGET BASE

Senator NUNN. General Davis, how many Trident submarines with D-5 missiles would be required to cover 50 percent, 75 percent, and 100 percent of the hard-target base?

General DAVIS. Senator, as I mentioned in the previous question, I regret that I will be unable to adequately answer your question [deleted].

INTERIM MX BASING AND LAUNCH UNDER ATTACK

Senator NUNN. General Davis, some who advocated the current MX scheme—basing in existing silos, hardened or not—stated this should be coupled with a launch-on-warning or launch-under-attack concept. Are these concepts part of the silo-basing concept and what does this mean for strategic stability?

General DAVIS. Senator Nunn, MX in any basing scheme—including silo-basing—will improve our near-term warfighting cabability. [Deleted.] MX will provide a prompt counterforce threat against them.

Although the United States has never espoused "launch under attack" as our only acceptable course of action, with MX in silos the Soviets will never be able to plan a preemptive strike without contemplating the consequences of timely MX execution before their attack has had its full effect. I believe this strong perceptual deterrent—which is consistent with our retaliatory posture—will promote rather than detract from strategic stability.

LAUNCH UNDER ATTACK

Senator NUNN. General, in your view, does a launch-under-attack posture lower the nuclear threshold and risk conflict escalation?

General DAVIS. No sir. U.S. strategic forces have the capability to retaliate successfully under any conditions. The Reagan strategic program will strengthen this. While we cannot afford to rely on "launch-on-warning" or "launch-under-attack" as the solution to ICBM vulnerability, the Soviets cannot ignore our capability to do so, and must account for it in their own calculations.

RESTORATION OF ESSENTIAL EQUIVALENCE

Senator NUNN. General Davis, when does the Reagan strategic modernization program restore the levels of essential equivalence that existed in 1977? When would this level have been achieved under the Carter program? And would either program approach the 1977 level of essential equivalence and does the Reagan program lag behind the Carter program in any respect?

General DAVIS. Neither the Reagan force nor the Carter force would restore the 1977 level of essential equivalence by the end of the decade. In 1990, our analyses show the Carter and Reagan forces [deleted.]

Projecting the Reagan and Carter forces to the mid-1990s [deleted].

BOMBER SURVIVABILITY

Senator NUNN. General Davis, what are your views on B-52 and B-1 bomber survivability on the ground in the Continental United States, Conus?

General DAVIS. [Deleted.]

BASE SAFE ESCAPE

Senator NUNN. General, how important is fast escape and what are your views on how we can improve bomber survivability in this respect?

General DAVIS. As you can well imagine, Senator Nunn, we accord a very high priority to what we call base safe escape time. Unless both we and the Soviets are confident that our alert aircraft can survive an attack by Soviet SLBM, their effectiveness as a deterrent is jeopardized. [Deleted.] We can either move our most valuable aircraft further inland—which we are doing—or encourage the Soviets to establish patrol areas further from the U.S. coast by improving our anti-submarine capability and conducting more frequent exercises.

We can do and are doing much more in the area of reducing required reaction time. There are also two aspects to this factor—the number of aircraft that need to escape and the time required to escape.

[Deleted.] We can also further disperse our bombers in periods of tension or reinstate satellite basing plans. [Deleted.] We have completed or initiated action on some of these measures and are planning for others.

[Deleted.]

DYNAMIC BALANCE MEASURES

Senator NUNN. General Davis, how important are the dynamic balance measures of military damage expectancy and residual weapons, and how do they vary through the 1980's under the older Carter program as compared to the new Reagan program?

[Deleted.]

General DAVIS. Senator Nunn, we regard MDE as an important measure of effectiveness because it accurately depicts warfighting capability in terms of military Installation damage. Likewise, we believe residual weapons are an important measure of effectiveness because they reflect war sustaining capability after counterforce or counterforce/countervalue exchanges. Together, they provide a measure of the task remaining (surviving military and economic data base) to forces remaining (US residuals). The above chart [deleted] makes a direct comparison of MDE and residual weapons between the Carter program (CG-80) and the Reagan program (Planned

Force). Both forces are relatively equal in terms of MDE throughout the 1980's. [Deleted.]

REAGAN STRATEGIC PROGRAM

Senator NUNN. General Davis, as you know, the Strategic Air Command has compared the dynamic U.S. and Soviet strategic nuclear capability of 1977 to the balance in the past several years and also projected to 1990. You updated portions of this analysis last fall and said you were still completing the analysis. Have you finished the analysis and what is the comparison of the military damage expectancy, MDE, and residual weapons under the Carter strategic plan, as outlined in SAC charts in February, 1981, as compared to the same categories under the Reagan plan? Does this analysis assume the MX in nonhardened Minuteman silos?

Does the Reagan plan bring us back to the 1977 level of MDE and if so, when? How important is MDE and what systems contribute the most?

Does the Reagan plan equal or better the Carter plan in terms of residual weapons, and when? If not, what is the gap and does this plan ever close it, and when?

Does the Reagan plan actually increase and extend the window of vulnerability before its major impacts are reflected in the dynamic strategic nuclear balance?

General DAVIS. Senator Nunn, as you know, the Comparative Strategic Force Analysis I presented in November 1981 was based on strategic doctrine reflected in PD18. I also mentioned that we were updating our analysis to include the latest targeting guidance. This is an extensive effort requiring modification of our analytical model and restructuring of the target data base. This process is still underway and we would be glad to share the results of our updated analysis when completed.

Because our current assessment of the balance is essentially unchanged, I would like to review the analysis presented in November. We regard MDE as a dynamic measure of effectiveness because it depicts warfighting capability in terms of military installation damage. Currently, bomber weapons contribute most to MDE against hardened targets. SLBMs, by virture of their numbers, contribute most to MDE against softer targets. When MX is deployed in a survivable mode and the D-5 comes on line in the early 1990s, they will be effective against the full target spectrum.

In mid-1977 there was essential equivalence with an approximate [deleted] capability for both U.S. and Soviet forces, and with [deleted]. Our overall strategic position was projected to remain sound throughout the decade with the 1977 planned force. Later, [deleted]. A comparison of current 1981 alert forces shows [deleted] respectively, after a counterforce exchange [deleted].

Comparing the Carter and Reagan strategic forces in 1990 show that they are [deleted].

[Deleted.]

Projecting the capability of the Reagan force to the mid-1990's [deleted] providing there is no significant change in the 1990 threat estimate and no significant delays in the recommended modernization programs.

Although I mentioned that [deleted] the Reagan force actually begins closing the window of vulnerability sooner than the Carter force by contributing slightly more MDE through B-1B deployment between 1987 and 1989.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

Senator LEVIN. General Davis, your statement on page 7 refers to the Advanced Technology Bomber, ATB, as a "high risk technology basket." Your predecessor at SAC, General Ellis, took a diametrically opposite position. He stated the following in a response for the record of our November 12, 1981, hearing on the Reagan Strategic Program:

"The fundamental questions here are affordability of a less risky but lengthened ATB program in terms of the strategic balance, and the nature of the risk in terms of basic design validity. Although the ATB will be built using this particular technology, I do not see major design problems that put the effort in the high-risk category."

In fact, General Ellis characterized the probability and price of this type of risk as "relatively low" and concluded, "In my opinion, the consequences of delaying the program to eliminate all the uncertainty are more detrimental than proceeding as rapidly as possible and accepting a degree of risk."

Why have you reached a different opinion than General Ellis? What information exists to support your different conclusion?

General DAVIS. To my knowledge, the risks associated with the program have not changed. They deal primarily with the peculiarities of the technology and those specifics are classified, special access required. None of the risks are insurmountable, but they are of the nature that if pushed too fast, could result in a less capable, more costly system which in the end may not achieve an "early" IOC. Considering the importance of this system and investment required, it is critical that we have a very good program foundation before starting. The two bomber program gives us the time to develop that good program foundation; and the combination of B-1Bs and ATB will give this nation the best long term strategic bomber forces at the lowest cost.

Senator LEVIN. General Davis, to what are you referring in the ATB program as being "high risk"—the schedule, cost, performance ability to carry out its mission?

General DAVIS. Again, the risks deal primarily with the peculiarities of the technology and these specifics are classified. The general areas to be dealt with are efficiency in manufacturing and optimizing the configuration to best exploit the unique capabilities.

Senator LEVIN. General Davis, what has changed about the ATB program since last year when the Air Force, General Ellis and the Defense Department witnesses indicated the ATB program was not a high-risk technology?

General DAVIS. The term "high-risk" is a relative term and I believe this is where some confusion exists. The risks associated with the ATB program are higher than normally associated with an aircraft development program because of the immaturity of the low observable technologies. However, none of the risks are insurmountable and the early 1990's IOC allows us the time to study and mature the system thereby eliminating the risks before we enter the production program.

ATB IOC

Senator LEVIN. General Davis, last last year when the Administration was selling the B-1 program it said that the Stealth bomber would be deployed "in the early 1990's," even though there was strong evidence it could be deployed before then. On page 9 of your statement you now say the Stealth bomber IOC is "in the 1990s." Have you again slipped the Stealth bomber IOC to further prevent it from competing with the B-1? Can you assure us that the Sealth bomber IOC, which is classified, is the same now as it was in September/October, 1981?

General DAVIS. Yes, Senator Levin, I can assure you that the expected IOC of the ATB has not changed in the last six months.

STEALTH BOMBER IOC

Senator LEVIN. General Davis, late last year General Ellis concluded the following about the President's strategic modernization plan: "And, in my opinion, the MX and the Advanced Technology Bomber IOCs have been slipped to pay for the B-1 . . ." Is it not true that you have slipped the IOC of the Stealth bomber to pay for the B-1?

General DAVIS. No, sir, that is not correct. The IOC of the ATB has not been slipped.

Senator LEVIN. General Davis, on page 7 of your statement you declare, "The defenses the Soviets develop against one bomber will be much less effective against the other. In fact, a force mix of B-1B and ATB will enhance each system's penetration capability, creating a multiplier effect in our bomber force." General Ellis dismissed this thesis by answering in the following manner to the following question posed for the record last year: "Question: General, in your view, would the introduction of the B-1, with its speed and ability as a piloted aircraft to maneuver as it penetrates in response to threats contribute significantly to the Soviets' difficulties in defending against both the B-1 and the ATB?

"Answer. Much of what the Soviets are doing to counter the ALCM can also be used to defend against the B-1. The difference, of course, is the B-1's speed and maneuverability, as well as ECM. The ATB is a much more difficult problem for the Soviets. In my opinion, the B-1's capabilities as a manned penetrator do not contribute in any major measure to the Soviet's problems in defending against both the B-1 and the ATB, other than the fact that the number of penetrators of whatever capability would compound their problem."

General Davis, why have you reached a diametrically opposite conclusion?

General DAVIS. [Deleted.]

ALCM DELAY

Senator LEVIN. General Davis, on page 12 you state that between 1977 and 1979 "the deployment of the ALCM was delayed." It was my understanding that this program was accelerated after President Carter decided against building the B-1 bomber. On what evidence do you base your conclusion about delay in the ALCM program?

General DAVIS. Delays in the ALCM program can be attributed to a number of interrelated doctrinal and management issues. Initially, in the 1977 timeframe, HQ USAF and HQ SAC reviewed numerous B-51/B-1 employment concepts utilizing ALCM/SRAM and gravity weapons. The June 77 B-1 cancellation forced a reevaluation of our manned bomber employment methodololy. Advantages of procuring extended range ALCM vice the original ALCM-A as well as the standoff/penetrate scenario were exhaustively studied. The eventual decision to procure the longer range ALCM and to conduct a full scale competition between General Dynamics and Boeing Aerospace Corporation also contributed to the delay. The decision in 1978 to concurrently develop and integrate the B-52G/H offensive avionics system with the ALCM was another significant contributor to program protraction.

ELF SURVIVABILITY

Senator LEVIN. General Davis, on page 15 and 16 you discuss our present and future C³ requirements for the strategic force. You say, "Our present C³I network must provide responsive and enduring support to the National Command Authority and strategic forces through all levels of conflict, from a low-level exchange through a massive homeland-to-homeland exchange followed by a protracted series of lesser-intensity strikes."

Considering [deleted] wouldn't the proposed ELF system fail to provide the "responsive and enduring" communications support you say is required to the NCA and strategic forces through all levels of nuclear conflict?

General DAVIS. [Deleted.]

ELF JUSTIFICATION

Senator LEVIN. General Davis, you also state on page 16 that "during a benign pre-SIOP environment, SAC is confident in its ability to support the Joint Chiefs of Staff and the NCA." If you have this confidence today, why do you need to add the proposed deficient ELF system for peacetime uses, the justification proposed by the Navy, when it acknowledges [deleted] and does not contribute to supporting the NCA and the strategic forces during all levels of a nuclear conflict?

General DAVIS. [Deleted.]

SURVIVING ICBM WEAPONS

Senator LEVIN. General Davis, SAC has established a requirement for a certain number of surviving ICBM reentry vehicles to fulfill U.S. targeting objectives. The MX with MPS basing was designed to increase the number of surviving land-based ICBM reentry vehicles to the required level by 1989. It is not clear in President Reagan's proposal what level of surviving ICBM reentry vehicles is being sought or when it will be attained.

(a) How many surviving land-based ICBM reentry vehicles does SAC require in the early 1980's mid-1980s and late 1980s?

(b) Show the total number of projected surviving reentry vehicles in the early 1980s, mid-1980s and late 1980s with the current force level, with MX in hardened silos, and with MX in unhardened silos.

General DAVIS. The number of surviving land-based ICBM reentry vehicles you refer to resulted from a thorough analysis based on guidance which is now dated and a projected Triad force structure which is no longer valid. Requirements can only be stated within the context of force employment guidance and overall force structure. SAC is currently performing an in-depth analysis of projected force capabilities from which we will be able to determine Triad requirements. Our analysis will be completed and available to you in June 82.

I am able to comment on projected surviving reentry vehicles associated with current force levels including the MX. Our projections are based on the following assumptions: 40 MX in the 1990 time frame only; in the hardened case, MX silos are hardened to 4800 psi; in the unhardened case, MX are placed in existing MM silos. The following table reflects our projections for the scenario where all ICBMs rideout the full maximum attack:

TOTAL SURVIVING ICBM REENTRY VEHICLES

[Table deleted.]

NUMBER OF MX DEPLOYED

Senator LEVIN. General Davis, what is the basis for reducing the number of MX missiles to be deployed from 200 to "at least 100"?

General DAVIS. Senator, we envisioned deployment of 200 MX in 4600 MPS shelters under the Carter strategic modernization plan. As I have stated previously, the Carter and Reagan forces will provide us approximately equal warfighting capabilities. Although the Reagan force will deploy only half as many MX, the difference in warfighting capability will be made up by deployment of the B-1B—a modernization program not planned under the Carter force. In addition, as long as MX are in production a decision for an expanded deployment remains open.

LONG-TERM MX BASING MODES

Senator LEVIN. General Davis, let me ask you some questions about the MX basing mode decision confronting us. The Administration has proposed choosing among the continuous-patrol aircraft, ballistic missile defense, and deep-underground basing for a permanent home for the MX missile. Two of these have been rejected before because of a host of military effectiveness and cost effectiveness problems—deep-underground basing and air mobility.

I understand that the continuous-patrol aircraft concept is different from the previously rejected air mobile concept, but all that does is raise a new host of technical problems.

The third basing mode—ballistic missile defense, BMD—is still an unproven technology in many crucial respects. Even though significant progress has been made in developing the low-altitude system, LoADS, it promises to be ineffective by itself in protecting silos, since it depended heavily on the deception of a multiple protective shelter basing mode.

The layered defense, which uses LoADS with another high-altitude system to intercept incoming warheads in space, is an extremely high-risk system from both scientific and technical viewpoints, primarily because the space intercept component is at the very frontier of technology which has yet to be proved.

Which of these three basing modes do you think has the best potential for proving itself technologically, financially and militarily, and thus solving our MX basing problem?

General DAVIS. Your assessment of the previous studies of Continuous Patrol Aircraft, Deep Basing and Ballistic Missile Defense is correct. The current concepts for these options do contain some new provisions. Until these concepts are firmed up and the ongoing studies are completed, I am unable to define the single best basing mode or combination of modes to solve our ICBM survivability problem. However, in my best judgment, a defended deceptive basing concept affords us an attractive option.

BALLISTIC MISSILE DEFENSE

Senator LEVIN. General Davis, yesterday you spoke to the National Security Industries Association at the Mayflower Hotel downtown. I understand that you stated, among other observations, that ballistic missile defense will be very important to our solution of the ICBM vulnerability problem and that we will need BMD coupled with deceptive basing to correct ICBM vulnerability.

Last October when the President announced his strategic package, Defense Secretary Weinberger said to reporters, "Well, the decision on ABM, our ballistic missile defense, is simply to study and see if we can get something far more effective than we have now. What we have now is not good enough. What we are doing at the moment is an examination of whether or not we can get a more effective ballistic missile defense."

General, have you made up your mind already that we should deploy MX in a deceptive basing mode coupled with a ballistic missile defense? I thought the Administration still was studying the matter. Do you have some new information that Defense Secretary Weinberger does not have? You are not prejudging the outcome of the Administration's studies are you?

General DAVIS. No, I am not prejudging the outcome of the study, nor have I made up my own mind that BMD is the answer to the ICBM survivability problem. My comment that BMD would be an important factor in solving this problem was in response to a specific question about BMD. I did not address the other options at all.

Nonetheless, I do believe that BMD in conjunction with land based deceptive basing is at this point one of the more attractive options.

Senator Levin. General Davis, lost in the debate about whether to pursue a ballistic missile defense system seems to be the realization that should we decide to pursue such a system which requires abrogation or significant modification of the ABM Treaty, we have caused ourselves another significant problem as we try to solve the ICBM basing mode dilemma.

If the Treaty is abrogated or modified this would permit the Soviets to deploy a ballistic missile defense system also, would it not? Since they have been conducting a more vigorous BMD research program than we have in the past, even though we are technologically ahead of them, this means they might be able to deploy an extensive system more quickly than we might, does it not?

Such a system could significantly reduce the penetration and effectiveness of our own missile warheads attacking the USSR, would it not?

Even if it were not completely effective in protecting the U.S.S.R. from American warheads, our confidence in the military effectiveness of our warheads would be reduced by the deployment of an extensive Soviet BMD system, would it not?

In order to compensate for either a reduction in the military effectiveness of our warheads or our confidence in them, we would have to greatly expand our strategic arsenal as a hedge against the Soviet ballistic missile defense system, would we not?

If we did not expand the arsenal, we probably would have to greatly increase our R&D on advanced penetration measures for our warheads, such as decoys or maneuvering warheads, would we not?

General Davis. Senator Levin, that is really a five part question. I will respond to each of the first two parts separately and combine the final three.

First, as you are aware, the Soviets already have deployed a limited BMD system within the limits of the treaty. If we decide to modify or abrogate the treaty, it is quite possible that the Soviets would elect to expand their system. Obviously, that consideration would be among the factors weighed in reaching a decision on our own BMD. On the other hand, there is no assurance that the Soviets will not broaden their BMD deployment regardless of any US action. The treaty specifies that either party may withdraw with 6 months notification.

Second, it is true that the Soviets could probably outpace us, at least in the initial stages of a comprehensive BMD deployment. However, their ongoing research program is only one factor, and not a major one, that gives them an edge. As you correctly point out, our own technology is probably superior to theirs. Rather, their edge derives from operational and maintenance experience, an in-being system, prototype follow-on, and interceptor test firings.

With regard to the last three questions "Not completely effective" covers a very wide range of capability. At the lower end of the range, our loss of confidence would not be great and we could compensate by using [deleted]. At the upper end of the range, our loss of confidence would be greater, but we might compensate with [deleted].

An extensive Soviet BMD deployment, or any other significant defensive improvement, will require a response in kind from the United States—that is the nature of the strategic balance. Our greatest strength is the flexibility and responsiveness of a balanced Triad, including ICBMs. So long as we have the resolve to maintain that strength, future Soviet modernization efforts will not detract from SAC's ability to maintain deterrence.

Large scale deployment of an effective BMD system [deleted]. However, as your questions suggest, we would not be without options in such a case. One option would be to [deleted] with or without a US BMD. Alternatively, we could increase our own Triad either overwhelm or circumvent—for instance, by emphasizing penetrating bombers and cruise missiles—the ABM system. Which track to follow and to what extent would depend on the scope and predicted effectiveness of the Soviet defense.

COST OF BACKFITTING B-1B

Senator Levin. General Davis, your statement on page 6 states that all but the first 18 production models of the B-1B will be equipped from the beginning to carry cruise missiles as well as other weapons. Is the cost of backfitting these 18 aircraft with cruise missile carriage capabilities included in the overall $20.5 billion fiscal year 1981 dollars total program cost for 100 B-1Bs as recently certified by the President?

If not, how much more will it cost to backfit almost 20 percent of the B-1B force with cruise missile capability in fiscal year 1981 and current dollars?

General Davis. Yes, Senator Levin, the cost of backfitting initial aircraft with cruise missile carriage is included in the $20.5 billion fiscal year 1981 dollar total program cost.

CHANGES TO SIOP

Senator Levin. General Davis, your statement discusses the deep-penetration mission of SAC, sending bombers deep into the Soviet Union to destory targets, and says this mission is "especially important against mobile and imprecisely located targets."

I agree that we would maintain the capabilities to conduct deep-penetration missions. At this point in time I do not believe that only having a stand-off capability to launch cruise missiles against Soviet targets from outside Soviet air space is sufficent. However, it is my understanding of the way we assign bomber missions in a SIOP that bombers are not given missions [deleted] of targets in order of importance, and if one already has been destroyed by another weapon, the bomber proceeds to the next on the list. I understand that bombers are [deleted].

Have we changed the SIOP, mission targeting procedures to enable bombers to engage [deleted] as you now state?

General Davis. [Deleted.]

INTELLIGENCE CAPABILITIES

Senator Levin. Do we possess the intelligence capabilities to locate mobile targets within the Soviet Union, and the command, control and communications to the bombers to change their SIOP missions in midstream to take advantage of discovered "mobile and imprecisely located targets"? [Deleted.]

General Davis. [Deleted.]

FIRST STRIKE CAPABILITY

Senator Levin. General, on page 8 of your statement you say, "Some contend that the proposed deployment of MX in silos would create a decisive first-strike capability. This is simply not true. The quite limited deployment proposed will hold at risk only a small portion of Soviet strategic forces."

Please provide for the record the detailed force exchange assumptions and systems characteristics assumpions, target hardnesses, etc, which support your conclusion. In this please do this for MX, as a first case, and as a second case include the hard target kill capabilities of Minuteman III and Trident II for the same timeframes and including any expected improvement in Minuteman III CEPs.

General Davis. Senator Levin, a decisive US first-strike capability would exist only when the Soviet strategic offensive arsenal could be drawn down sufficiently to limit damage to the US and deny the Soviets their strategic objectives. There are two force exchange assumptions required to determine a US "best case" first-strike capability—the US preempts with a first-strike, and the Soviet ICBMs rideout the attack. If sufficient Soviet residual weapons remain to inflict severe damage to the US, no decisive first-strike capability exists.

Our analysis, based on projected 1990 forces, indicates that the [Deleted.]

MINUTEMAN III HARD TARGET CAPABILITY

Senator Levin. General Davis, during his appearance before the subcommittee earlier today, Under Secretary of Defense for Research and Engineering, Richard DeLauer, stated that our present Minuteman III missiles have significant hard target kill/counterforce capabilities against Soviet missile silos. Do you agree with this assessment?

General Davis. Although our current Minuteman III force is effective against a wide range of hardened Soviet targets, [deleted]. Our current Minuteman III accuracy is over [deleted]. Even with the higher yield MK 12A warhead, the damage achieved against superhardened Soviet targets is [deleted].

ATTRIBUTES REQUIRED FOR GUIDANCE

Senator Levin. General Davis, on page 2 of your secret statement you say, "many of our weapon systems lack the warfighting and survivability attributes called for in current national guidance."

Could you provide for the record this guidance and specifically describe how each of our present strategic weapons fail to meet it?

General **Davis**. Broad nuclear weapon employment policy is established by the Secretary of Defense, and the specific planning guidance by the Joint Chiefs of Staff. That guidance is lengthy and complex, but it can be partially summarized. [Deleted.] To realize this requisite capability, we must have strategic forces which are flexible, survivable, and endurable with a strong counterforce potential.

In aggregate, our strategic forces have too little capability to attack Soviet military targets, especially hardened and mobile targets. Our strategic systems lack the flexibility required to provide the NCA with a broad range of responsive attack options. Each of our strategic systems [deleted]. We are further constrained from filling the dictates of the guidance by the relative vulnerability of our ICBM force and by the limitations of our existing C^3I capabilities.

[Whereupon, at 9:39 a.m., the subcommittee recessed, to reconvene in open session.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

WEDNESDAY, FEBRUARY 24, 1982

U.S. Senate,
Subcommittee on Strategic and
Theater Nuclear Forces,
Committee on Armed Services,
Washington, D.C.

STRATEGIC FORCES—RESEARCH AND DEVELOPMENT AND ACQUISITION

The subcommittee met in open session pursuant to other business at 11:38 a.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Quayle, Nunn, and Levin.

Staff present: Frank J. Gaffney, George K. Johnson, Jr., Patrick L. Renehan, James C. Smith, and Kathleen Troia, José E. Martinez, professional staff members; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon; Arnold Punaro, assistant to Senator Nunn; Greg Pallas, assistant to Senator Exon; and Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator **Warner**. The subcommittee will resume the hearing that we started at 8 a.m. this morning.

The chairman extends apologies to the witnesses and others in attendance.

Senate floor action required my presence, therefore I could not be here earlier.

We welcome Dr. DeLauer, the Under Secretary of Defense for Research and Engineering, to provide a programmatic overview with regard to research, development and acquisition aspects of America's nuclear forces.

Dr. DeLauer and his deputy for strategic and theater nuclear forces, Mr. T. K. Jones, are well known to members of the committee and we look forward to receiving from them an update on the testimony they provided in last fall's hearings on President Reagan's strategic forces modernization program.

In the previous session, earlier today, we heard General Davis' views as to the essentiality of major strategic programs to our national security posture. We anticipate that Dr. DeLauer will amplify on the degree to which these programs—like the MX, the B-1, the Trident submarine and missiles—are central components of President Reagan's strategic force modernization effort and consequently enjoy high budgetary priority.

We will begin in open session. The Chair and members of the committee will try very hard to keep as much of this testimony as possible in open session so as to better inform the American public of the necessity for the very substantial defense budget.

STATEMENT OF HON. RICHARD D. DeLAUER, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, ACCOMPANIED BY T. K. JONES, DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING, STRATEGIC AND THEATER NUCLEAR FORCES, AND JAMES R. MILLER, DEFENSE INTELLIGENCE AGENCY

Dr. **DeLauer**. I also have with me Mr. Jim Miller from DIA. In case questions might be posed in regard to particular aspects of the threat, I have him to assist me.

You have already introduced Mr. T. K. Jones as my deputy on strategic systems.

Senator **Warner**. Before you start, I am joined by my colleague, Mr. Quayle.

Do you care to make an opening statement, Mr. Quayle?

Senator **Quayle**. I will yield, Mr. Chairman.

Dr. **DeLauer**. Good morning, Senator Quayle. How are you?

Senator **Quayle**. Fine. How are you?

Dr. **DeLauer**. Hanging in there. I have submitted for the record my full statement which is, of course, classified, but I have extracted from that a summary that I think I can keep completely unclassified. We will then have to take it from there, Mr. Chairman, when the questions start to get more explicit.

I should like to give you, again, a quick overview of the strategic program, and if we can, perhaps later, talk a little bit more about the threat.

STRATEGIC PROGRAM OVERVIEW

As you know, I was over here talking to you last year when the Secretary presented the President's program on strategic modernization. Then we had separate sessions throughout the end of last year explaining the details of it.

I think for completeness I would like again to go over the essential elements of the President's strategic modernization program.

As you remember, we argued and presented the program as a coherent program, a program that had five elements to be implemented over a period of a decade. The program was to explicity redress the strategic imbalance that now exists between us and our adversary. The program was predicated on two fundamental principles of deterrence, that is, survivability and endurance.

In no way was the program intended to be construed as a tit for tat program matching the adversary in numbers, or even in capacity is some respects. We hope to beat them in quality and the program was conceived to provide us the initiative so that at least the economic balance as well as the military balance of the equation will always be heavily in our favor.

I think that we can demonstrate that in a way that will support the fact that it is coherent, that each part of the program builds on the others. All the parts support survivability and endurance. They are all necessary to put the country in a position so that it would be to the Soviets' economic and military advantage to sit down and start talking about meaningful arms reductions, not just arms limitations.

That is the basic concept of the President's program.

STRATEGIC C^3

So far as the details, as you know, it starts with the most important aspect which is the whole strategic C^3 element. This is to provide investment in the command, control, and communications systems that will permit the national command authorities, as well as the operating forces, to be able to operate our strategic forces throughout any aspect of the conflict. It is survivable and enduring.

BOMBER FORCE MODERNIZATION

The second element of the program is the modernization of the bomber force. The availability of modern technology in regard to the ability to penetrate Soviet defenses has led us to the recommendation that we should upgrade the existing bomber force to take advantage of this technology. In turn, the threat that the Soviet Union presents to us in regard to on-ground vulnerability, as well as enroute vulnerability of our existing bomber force, causes us a concern that we have to redress very soon.

If one examines the Soviets' defensive capability, one finds that one of their major investments has been in the defense of their homeland. This defense is many hundreds of miles deep; it consists of many, many elements of surveillance and fire control and command and control of any force structure that might oppose forces going against the Soviet Union.

This is a very large investment but it has its limitations. These limitations are such that we can exploit their weaknesses. We can do it now and we should do it now. We should not give them any respite in time that permits them leisurely to divert assets from other things to be able to counter a threat later in the decade.

This is one of the major supporting elements of the B-1B program. The B-1B is a modification of a supersonic bomber that was previously taken under development early in the decade and was curtailed in 1977. In the meantime, we were able to examine this whole question of how you would penetrate the Soviet defense system. We were able to provide a design and a capability in the basic B-1 airframe-and-engine combination that would indeed provide us with a very near-term, highly capable, low-altitude, subsonic penetration capability, one that would, in turn, require the adversary to do something right now in regard to protecting that set of installed assets.

In addition to the B-1B, there has been a technology program which provides the United States an opportunity to have low-observable equipment. That is about all I can say about that subject in an open hearing. I think the committee is well aware of the nature of the program; it was briefed very well, and you considered it in detail last year.

LAND-BASED ICBM FORCE

The third leg of the modernization program is the upgrading of the land-based ICBM force.

The MX force is contemplated to provide a very high, accurate capability. This has been demonstrated at the present time by the development program of the MX missile.

What is still an open question, a question that has to be answered within the next 15 months at the direction of the Congress, is what the permanent basing mode of the MX missile is to be. This basing mode is undertaken with the same strategic objectives of survivability and endurance.

We have three major activities going on in that area right now. One is to take a look at whether or not a defensive capability will provide us survivability; that is, an antiballistic missile defense of the MX system. In this ABM mode the whole question of deceptive basing is an element of such a defense.

The other is a survivable and enduring capability, referred to as deep underground, which provides essentially a citadel for the MX missile which would protect those assets against any Soviet threat and would have them available in the period after the initial exchange. We believe this would be a strong deterrent capability.

The third study option is one that was recommended to us, to the Department and the President, by the Townes committee. This option looks at a survivable airborne capability that would also do the job of providing a survivable MX basing mode.

All three of those programs will be examined in detail.

We have some odds-and-ends problems in regard to authorization and appropriation in regard to exploring the continuous patrol aircraft concept.

In addition to these three major study efforts, we have to come back to the Congress by July 1, 1983, with a recommendation of what the President would recommend as the permanent basing mode.

We have in the meantime undertaken a program of temporarily installing approximately 40 MX missiles as they come off the production line, in existing silos.

As we discussed with you last fall when we presented the program, at that time we had two options that we were considering. One was temporarily installing them in some refurbished Titan II silos that were being made available as we deactivated the Tital II weapon system. The other option was to deploy them in existing Minuteman III silos which were upgraded in the last decade with the express capability of being able to accept the MX missile.

We have examined those two options. From a cost-effectiveness standpoint, as well as complying with the wishes of the Congress on money that is to be spent on temporary installations particularly as it concerns hardness, we have come up with a decision that was announced by the Secretary just recently. The decision stated that the preferred option will be to install the MX missile in Minuteman III silos. That is where we are right now.

In a closed session I can give you the rationale of why we arrived at that kind of conclusion and the details of some of the studies.

[Prepared statement of Dr. DeLauer follows:]

PREPARED STATEMENT ON STRATEGIC FORCE MODERNIZATION BY HON. RICHARD D. DELAUER, UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Mr. Chairman and members of the committee: I am pleased to testify before you in support of our program for strategic force modernization. In hearings late last year I provided thorough testimony on our five part program to improve the deteriorating strategic balance with the Soviet Union. I would like to continue where I left off in last year's hearings. I will therefore not spend my time today reiterating the complete structure of our strategic force modernization program. Rather, I will summarize the program and then address what we hope to achieve relative to our strategic posture vis-a-vis that of the Soviet Union. In doing so I will stress the threats that the strategic modernization program is designed to counter as well as the responses we hope to elicit from the Soviets. My goal in this and subsequent hearings is to carefully lay out the rationale for the entire program in order to clarify the importance of each of its component elements.

In recognition of the need to eliminate the imbalance of U.S. strategic forces relative to the Soviet Union while reducing the dangerous instability of the current strategic relationship, we have carefully evaluated our strategic force posture on a mission oriented basis. The result of this evaluation is a comprehensive package of strategic programs, as announced by the President last October, which will redress the most serious weaknesses in our current posture and place us in a position to reshape the U.S./Soviet strategic competition in the years ahead. We have thereby created a comprehensive strategic modernization plan that will meet the objectives of our strategy, serve as a coherent instrument of national policy, and greatly strengthen our deterrent posture.

Taken as an integrated entity, the strategic forces modernization program is a good example of cost-conscious design. It negates much of what the Soviets have invested over the past decade in their pursuit of nuclear superiority while spending far less than what the Soviets are projected to spend. It must be emphasized that we are not trying to equal Soviet expenditures on strategic forces. What we have achieved is a cost-effective program which counters Soviet capabilities rather than duplicates their massive destructive power.

Our program for strategic force modernization will reverse the adverse trends in the U.S./Soviet strategic balance and reduce [deleted] the U.S. margin of inferiority that would have existed in 1990 under the previous program. Of equal importance, this program will significantly reduce the instability in the existing strategic relationship with the Soviet Union, as well as the incentive for a Soviet surprise attack on the U.S.

This long-range plan for strategic force modernization, consisting of five mutually supporting and reinforcing elements, must be addressed as a complete package if we are to achieve our national security goals and ensure continued deterrence of nuclear war. What we have accomplished in defining these long-range efforts, and what we hope to accomplish by carrying them out, depend in large measure upon your approval of the long-range nature of this effort. Our effectiveness in accomplishing our objectives will be weakened if a year-by-year approach to strategic force modernization is employed.

The principal objective of our strategic force modernization program is, of course, to ensure continued deterrence of nuclear war. In order to accomplish this we must improve the capability to control U.S. forces throughout crisis situations up to and including protracted nuclear war, improve the survivability and endurance of strategic offensive forces and intelligence resources, protect the U.S. population in order to reduce risks of coercion and blackmail, and counter Soviet capabilities and initiatives by exploiting their weaknesses. This is the basis for the structuring of our strategic force modernization program, a program which includes:

Enduring C^3 to link our forces to the national command authorities (NCA) at all levels of conflict, The required degree of bomber modernization, through the B-1B and advanced technology bomber (ATB) programs, to ensure we can continue to effectively reach and penetrate Soviet defenses,

Enhanced sea-based capabilities, through deployment of the Trident II missile, to ensure a survivable, effective at-sea capability against the entire target spectrum,

A modernized, effective ICBM force, through M-X in a long-range survivable basing mode, in order to counter the large Soviet counterforce threat, and

Defensive systems to protect our strategic forces, our leadership, and our population.

This program will ensure that our forces have the capability to survive, endure, and withstand the Soviet capability for protracted conflict in order to deter Soviet aggression and coercion and, should conflict occur, to preserve U.S. post war posture and international influence. It is important to recognize that war-fighting capabilities are an integral part of the Soviet doctrinal perspective. We are not choosing a war-fighting strategy over a deterrent strategy. However, we must recognize the Soviet strategy and capabilities as they exist, not as we might wish them to be. If we cannot cope with Soviet war-fighting capabilities, we will have a weak deterrent and a serious susceptibility to nuclear blackmail. The strong deterrent that we seek requires that we be able to successfully survive all strategies that the Soviets are capable of pursuing.

Once again I want to stress that survivability and endurance of our strategic forces and their supporting C^{3}I are our primary goals. Not only will this approach enhance our long-term strategic capabilities but it will force the Soviets into programs beneficial to the United States and to world peace—programs which will enhance deterrence, reduce instability, and reduce the incentives for surprise attack. Of equal importance, this approach will provide a strong incentive for the Soviets to negotiate meaningful arms reductions.

I would now like to discuss the Soviet doctrine and forces which have influenced the development of our strategic modernization program. In particular, it is important to review the approach the Soviets have taken toward the theory and conduct of protracted nuclear war since this impacts directly on our urgent needs for enhanced survivability and endurance of our strategic forces and their supporting C^{3}I.

Soviet military theorists acknowledge that a period of protracted nuclear operations, while not a necessary phase of a general war, is a possibility and should be anticipated in military planning.

The Soviets, in their military writings, hedged on the duration of general nuclear war. The usual formulation that such a war would be relatively short is often followed by a recognition that a world war could be lengthy because of the enormous military and economic potential of United States and NATO coalitions. In any general war, intense nuclear operations could last a few days followed by an exploitation or concluding phase of unpredictable duration. Soviet theorists suggest that significant advantage would accrue to the side that had been able to maintain military reserves and the means to employ them. The requirement for large standing general purpose forces; for reserves of arms, equipment, and raw material; and for protection of the governmental infrastructure flows from this contingency of protracted war.

In support of their doctrine, Soviet strategic forces and the C^3 systems required to employ them, have been designed to provide the Soviet leadership flexibility and redundancy in employment and control through the full range of possible conflict. Soviet strategic operational employment plans point to seizing the initiative through preemptive attack, thereby limiting damage to the USSR. While this is the preferred Soviet option, the Soviets also have the capability to launch on tactical warning if necessary.

Improved accuracy of the 10-MIRV SS-18 [Deleted.] and the 6-MIRV SS-19. [Deleted.] suggests that these systems will be employed against U.S. hard targets such as minuteman silos. [Deleted.] The Soviets have contingency plans for reloading and refiring missiles from ICBM launchers. An extensive network of support facilities exists which could store missiles, propellants, warheads, and ground support equipment that could be used to reconstitute a portion of the Soviet strategic rocket forces.

Soviet planning provides the capability to rapidly generate a large wartime SSBN force and maintain that force at sea. [Deleted.]

The Soviets also have a comprehensive program for leadership survivability and wartime management. For the Soviets, protecting leadership goes far beyond sheltering a small number of leaders in order to ride out a one-time major nuclear exchange, to later emerge for the task of recovery. Rather, the overall objective is continuity of leadership and government control throughout all phases of the conflict.

Specific capabilities that this program provides include unbroken wartime party control over the military, state apparatus, and general population; continued wartime troop mobilization in the trans- and post-attack periods of conflict; and the preservation of a wartime management infrastructure for the economy. The Soviet program is thus properly perceived as a militarized system of wartime national administration, encompassing the functions essential to the conduct and support of military operations, wartime economic management, and recovery. The program encompasses national command authorities, intermediate high command entities, military districts, and fronts; and the central party apparatus, government ministries, and ministerial entities at the national, republic, and oblast levels.

Evidence examined to date indicates that protective facilities developed for Soviet leaders at all levels exist primarily to insure continuity of command/management functions fusing all phases of a future war, conventional or nuclear. Comprising an extensive network of hardened exurban command posts and relocation complexes, these facilities provide physical protection of leadership cadres and the technical means (C^3) with which they can exercise command or management responsibilities in the pre-, trans-, and post-strike environment.

[Deleted.]

In the last decade, submarines and cruisers have been reconfigured with extensive communications antennas implying their use as command and control platforms. These antenna configurations have been observed aboard ships down to and including fleet level. This enhances Soviet C^3 survivability through continuity of command, allowing them the capability to communicate with fleet headquarters as well as with CINC Navy in Moscow.

Mobile signal units are the backbone of the mobile C^3 system and have been fielded for virtually every level of command in the Soviet Armed forces. When this extensive mobile communications system is active, it will probably produce highly complex, versatile, and redundant communication networks which operate throughout the Warsaw Pact. These mobile command posts give the Soviets extensive redundancy in controlling their forces for an undetermined amount of time. Mobile signal units probably will be the primary means that the general staff will control its field deployed forces. The airborne command platform is the most likely back-up system because of its survivability in the air. The Soviets' highly redundant and flexible mobile C^3 system greatly enhances their survivability in a protracted war.

Soviet leaders continue to consider civil defense to be an integral part of their overall military strategy, they assert that a credible civil defense contributes to deterrence, strategic stability, and the ability of the state to survive. High priority is given to the civil defense role in assuring wartime continuity of command and control.

The Soviet civil defense program is estimated to cost at least the equivalent of $2.3 billion annually. More than 115,000 military and civilian personnel are employed full-time in civil defense. [Deleted] Blast shelters exist for about 12 percent of the urban population. Consequently, successful evacuation remains the key to significant reduction of civilian wartime casualties.

Current Soviet air defenses against low altitude targets suffer from technical and operational deficiencies of the weapons themselves. The Soviets have improvement programs underway that will substantially improve their capabilities to detect, track, and engage such targets effectively.

Look-down, shoot-down fighters are in various stages of testing and initial deployment. The technology incorporated in these is expected to be comparable to the U.S. F-14 or F-15, AWACS aircraft with look-down capabilities are being tested, performance may be comparable to the U.S. E-3A. The SA-10 DAM is in initial deployment. It should be capable of intercepting low altitude aircraft and cruise missiles.

As these new low altitude capable air defense systems are deployed in sizeable numbers in the last half of the 1980's, penetration of Soviet air defenses by current, large bomber aircraft will become more difficult, particularly against those targets which the Soviets choose to defend heavily. However, the radar signature reduction techniques, high penetration speed, and new ECM techniques employed in the B-1B should reduce soviet defense engagement opportunities without an extensive and lengthy investment program.

[Deleted.]

[Deleted.] New Soviet strategic bomber [deleted] has a variable geometry wing configuration and is slightly larger than the U.S. B-1B. It probably has a capability to carry both cruise missiles and bombs for long range, intercontinental strike. [Deleted.] The new bomber will significantly upgrade the strategic strike capability of the Soviet long range air army.

There is strong evidence the Soviets have several [deleted] cruise missiles under development. The sea and ground launched versions could become operational [deleted].

[Deleted.]

Projected Soviet ICBM forces include both new types of ICBM's and follow-ons to existing systems. [Deleted.] These projections, however, are only estimates of likely Soviet developments. There are no technological or other constraints that would preclude development of payloads for existing missiles with different numbers of MIRV's. [Deleted.] The significant point is that different payload configurations might be developed for existing missiles in response to strategic requirements as the Soviets perceive them.

A review of Soviet writings regarding space shows that they view space as a military arena which must be dominated in order to achieve victory in modern superpower warfare. Current Soviet programs show quite clearly that they have taken comprehensive integrated initiatives to achieve this goal.

Soviet space activity is presently 85 percent military related. The space launch rate continues its 24-year growth rate with a record 97 successful launches in 1981. The real growth rate of expenditures on their space program of over 8 percent per year for 20 years is considerably in excess of that of the overall military budget. [Deleted.]

Future systems projected by the intelligence community show an accelerating war fighting trend. [Deleted.]

As I have noted, the current Soviet threat to our forces is real and the Soviets exhibit no inclination to slow the momentum of their strategic force buildup. The purpose of our strategic modernization program is to respond to this buildup, reduce our existing inferiority, and reverse the adverse trends in the strategic balance. We must not approach the subject of strategic modernization by considering only what reactive threats the Soviets might deploy in response to our initiatives. While we must certainly consider how they might react, it is of even greater importance for us to respond to the projected Soviet buildup and force the Soviets to react in ways that are beneficial to us. In essence, we must extract ourselves from the reactive mode which we are in. Our program is designed to take control of the U.S./Soviet strategic balance and shape it to our benefit and the benefit of world peace. Our goals of enhanced survivability and endurance of our strategic forces and their supporting C^3 are designed to accomplish this. A brief discussion of how the elements of our strategic modernization program have been designed to elicit favorable Soviet responses may further illuminate what we have set out to accomplish.

By basing MX in a truly survivable manner, we provide the Soviets with incentives for several favorable responses, beginning with increased reluctance to launch a first strike against us. Survivable MX basing reduces the Soviet incentives for fractionization, thereby reducing the projected threat. By placing some Soviet ICBM's and C^3 facilities at risk, we encourage the Soviets to divert some of their resources to the defense and survivability of those forces and facilities. Soviet expenditures of that type are not threatening, in fact, we regard them as stabilizing and welcome actions in the ICBM arena. As an additional or alternative response, they might opt for a more balanced triad of forces by increasing their SLBM forces. We would view such an increase as a favorable response because of the preference for survivable systems it would represent. Forcing the Soviets to invest in survivable systems not only enhances stability but also reduces Soviet incentives for a surprise attack against the U.S. If their forces are not vulnerable, they will have less incentive to use them in a crisis. Steering the strategic balance in the direction of survivability will also encourage the Soviets to take a more serious and urgent interest in strategic arms reduction talks since there would be less incentive to accumulate massive destructive power.

An enduring bomber force would have the unique capability to strike imprecisely located targets, such as Soviet C^3 or mobile forces, on a timing set by the U.S. command authority. The proposed B-1B/ATB force is being designed to perform this enduring function, thereby lessening incentives for a Soviet surprise attack. As opposed to the present B-52 force which was not designed for endurance, our planned force will have the capability to strike Soviet targets which they value most, such as leadership, C^3, and dispersed forces. This modernized bomber force will also stress enemy defenses from prelaunch to far forward to in-country defenses by a combination of fast base escape, dispersal capability, low observables, and modern electronic countermeasures. In just the area of air defense the Soviets would have to spend considerably more during the 1980's to counter the B-1B than our costs for B-1B deployment. Current estimates for a 10-year period exceed $100 billion. The ATB will require a whole new Soviet investment of a different type. Accordingly, the cost leverage is considerably on our side.

The present reality that the Soviets could embark in a precursor bomber attack that would disrupt our command, control, and communications network and sever the national command authorities (NCA) from our retaliatory forces is of major concern. In fact, it has driven us to initiate the implementation of a more survivable and enduring C^3 system. The purpose of large expenditures of funds for this new capability is to assure that the United States can respond to a Soviet attack and command our retaliatory force, that is our ICBM, bomber, and SLBM forces. Such a capability would make a precursor attack or a sustained nuclear conflict against the United States a very unattractive option for the Soviet planners.

While today the United States has a C^3 network that would allow the NCA to alert our strategic forces once a Soviet missile attack was underway, it is highly unlikely that this system could survive the initial attack. With the improved Soviet weapon systems, such as air and sea launched cruise missiles and the increased inventory of long range bombers, it is almost certain that a coordinated Soviet attack would disrupt the major part, if not all, of our existing C^3 capability. To reduce the Soviet attack options and minimize the potential for a precursor attack, our ultimate goal of acquiring an enduring C^3 system must be supported. Furthermore, an enduring C^3 system will provide the NCA with the ability in a protracted conflict to redirect our surviving assets; to coordinate our interceptor force to deny Soviet reconnaissance; and to reconstitute, through mobile command centers, our remaining forces. Such capabilities will reduce Soviet confidence in their ability to effectively conduct and win a protracted nuclear war and will thereby enhance our deterrence of such actions.

Deployment of the Trident II missile in Trident submarines commencing in 1989 will further enhance the capability of our sea-based forces, the most survivable element of our strategic Triad. This missile will provide an effective capability against the entire target spectrum, including hard targets. Deployment of this ability to effectively attack the majority of targets which the Soviets value will further decrease the incentive for a surprise attack against the United States. If the Soviets cannot be assured of eliminating the full spectrum of our retaliatory capability, they are less likely to initiate an attack. The inherent survivability of the Trident system will also reduce Soviet confidence in the effective conduct of extended nuclear war fighting and therefore enhance our deterrent posture. The prospect of a U.S. capability to attack the spectrum of targets from a survivable platform will also increase the Soviet incentive to move to more survivable systems. This will enhance stability and further decrease the possibility of nuclear war.

Strategic defenses have been neglected in the United States as a result of a strategy that relied completely on the threat of a devastating retaliatory strike to deter war. Deterrence of war remains our primary defense objective. However, the unprecedented growth in Soviet forces, giving them the capability to destroy a large portion of our offensive forces and still have a substantial force in reserve to strike our cities if we attempt to retaliate, forces us to adopt a new strategy. Further, the Soviet emphasis on doctrine and capabilities to wage a protracted nuclear war necessitates a commitment to defensive capabilities to assure that the Soviets are not encouraged to consider repeated strikes as a means of achieving military objectives, and to limit damage if deterrence fails. Finally, moving to a defensive strategy will negate the huge Soviet investment in offensive weapons, at significant cost leverage, and push them in the direction of reduced expenditures in such weapons as well as creating the incentive for arms control negotiations.

A vulnerable ICBM force equipped with MIRVs is the major destabilizing factor that we are faced with today since several of our RVs can be destroyed by each Soviet RV that is able to attack a U.S. silo before the missile in it is launched. This provides an incentive for the Soviet Union to strike first in a crisis. Active ballistic missile defense (BMD) is one of the ways we are evaluating to reduce the vulnerability of the ICBM force. BMD offers the possibility of providing secure basing at a relatively early date, [deleted] and of preserving the characteristics of the current silo based ICBM force. We believe that a BMD system of MX defense is feasible and would contribute to the stability of the strategic balance, but the cost and effectiveness of such an option must be examined in comparison to other possible approaches and in the context of our overall arms control process.

The primary focus of our BMD program is to bring the available BMD technology that was developed and has matured subsequent to the safeguard program closer to a deployable capability. We must do this independent of the MX basing decision. The Soviet Union has maintained an aggressive BMD program which has resulted in up-grades to the deployed system at Moscow and the capability to rapidly deploy a nationwide BMD. We, on the other hand, have maintained a first rate technology program but have no developed BMD systems, no established BMD production base, no operating experience, and no infrastructure to support a BMD. We cannot expect that the Soviet Union will continue to honor the ABM treaty with this asymmetric posture. We are also pursuing the technology to develop a nonnuclear BMD, for possible 1990's deployment, so that it will be possible to provide a defense against nuclear weapons without further proliferation of nuclear weapons of our own.

As a result of ignoring our strategic air defenses we have large gaps in the coverage of the North American air defense warning network and our air defence interceptors are obsolete. The Soviet Union has continued to modernize their bomber force with the Backfire bomber and its successor, which the previous administration was not successful in limiting in the SALT II negotiations. There are clear indications that the Soviet Union is continuing to improve its bomber force. At present the limited U.S. warning and defense capabilities against this open-ended threat give the Soviet Union the potential to carry out a strike against the United States, without warning, [deleted] denying the Soviets these capabilities is an important element of a balanced and stable deterrent.

Our air defense plan will focus initially on bringing the quality of warning to a level comparable to our missile warning so that there is sufficient time to initiate survival and attack options. In the long term we plan to restore an air defense capability that can effectively limit damage from airborne attack and deny airborne reconnaissance. With enhanced survivability and endurance, our air defense posture will provide for operations in a sustained conflict and will greatly reduce the Soviet attack options. This, in turn, leads to the stability and enhanced deterrence that we seek.

I would like to stress that our strategic modernization program is designed to support the president's goal of negotiated reductions in strategic nuclear weapons. By placing the major emphasis on survivability rather than on matching the Soviet destructive power, we achieve several goals. These include a substantial reduction in the Soviet incentive to strike first, a less costly approach to redressing the current imbalance, a lower intensity conflict if deterrence fails, and a posture more conducive to reductions.

Because of the emphasis on survivability, it should become obvious to the Soviets that continued expansion of offensive forces is useless. If they cannot successfully attack our forces, they will have little incentive to continue their massive buildup of offensive weapons. The prospect of negotiated reductions should then appear attractive.

The combination of the B-1B followed by the ATB also provides a strong incentive for the Soviets to emphasize defense. They currently have the largest air defense system ever deployed. The new U.S. bombers are expected to be effective against current Soviet air defenses, so a major upgrade would be required. This should also provide an incentive to negotiate reductions in offensive forces.

Finally, it needs to be emphasized that the strategic program is a coherent package. Major reductions in the program would provide no incentive for the Soviets to reduce the momentum of their programs or to negotiate in good faith. If we want to achieve meaningful strategic arms control, we must press on with the strategic program. This can be illustrated by the fact that the Soviets would not agree to negotiate on intermediate range nuclear forces until after the NATO decision to modernize was made and appeared to be solid.

I hope that this statement has provided you with an insight into what we are trying to accomplish with our strategic modernization program. Let me reiterate that this program, in its entirety, is required to reverse the adverse trends in the strategic balance with the Soviet Union in order to strengthen our deterrent posture. We have not designed a program to match Soviet capabilities but rather have taken the cost-effective approach of countering Soviet capabilities by addressing their weaknesses. In this manner we can force the Soviets to take further actions in their strategic programs which will be beneficial to the United States. Our program will reduce the Soviet incentive to increase offensive power, thereby enhancing stability, and will increase the incentive for meaningful arms control reductions.

It should be noted that even with this program we will still not completely eliminate the disadvantage which has been allowed to accumulate over the past decade. Elimination of any of its parts will increase the amount and duration of our disadvantage we cannot argue about the costs of defense without considering the costs of weakness. What we are doing is countering the Soviet drive for superiority while spending only half of what the Soviets spend.

Be assured that we are not embarking on a strategic modernization program which sacrifices our general purpose force capabilities. Our strategic programs, so crucial to ensuring the security of our Nation, comprise less than 15 percent of our defense budget. This program is affordable and is a small price to pay for the security it provides. There is no fat in the program I have presented. We have made all the cuts we can during the development of the budget and are left with the minimal program which will provide the enhanced strategic posture we so urgently need.

It is also important to note that there are no major increases in the overall defense budget in the research and development or operations and maintenance accounts; however, these are the only areas where reductions in TOA would result in comparable reductions in outlays due to the slow outlay rate for procurement accounts. To reduce the fiscal year 1983 deficit through reductions in defense spending, you must understand that our force readiness would be placed in grave jeopardy. I do not consider this to be an acceptable means of realizing economy in government. I urge you to carefully contemplate the effect of such actions.

Finally, I want to stress once more that this program for strategic force modernization must be considered as an integrated whole. I urge your support of the entire package so that we can begin to rectify the existing strategic imbalance. The program I have presented is the best we can hope for within budgetary constraints and development/deployment time frames.

Senator **WARNER**. Thank you, Dr. DeLauer. Would your colleague, Mr. Jones, care to amplify?

The threshold question, of course, that this committee must consider is the threat, and for that we will turn to your colleague, Mr. Miller of the Defense Intelligence Agency.

It is the responsibility of the Congress to make certain that the program proposed by the President matches that threat.

Would you give a brief overview of the threat as it existed 1 year ago when we were together, and now, this year, and particuarly as it justifies this increased defense spending?

STATEMENT OF JAMES R. MILLER, CHIEF, WEAPONS AND SYSTEMS DIVISION, DEFENSE INTELLIGENCE AGENCY

Mr. **MILLER**. Over the past several years the Defense Intelligance Agency has been conducting a detailed analysis of the threat presented by the Soviet Union. We have found it is continually increasing. The Soviets have a major modernization program which has been underway since the early 1970's when they started R. & D. flight tests of a new generation of ICBM's and SLBM's. There is a continuation of this effort across the board.

We have been able to assess the capabilities of those weapon systems and find that they pose a significant threat to the forces that we currently have deployed. We see no diminution of the Soviet advancement. As a matter of fact, we see a continuation of it.

In spite of some demographic and economic problems that the Soviets have, we see no limitations in the amount of expansion of their design bureaus, R. & D. facilities, and their R. & D. programs.

Senator **WARNER**. It is your professional judgment then that this threat underlies the necessity for the President to come forward and ask for the increase in defense spending?

Mr. **MILLER**. Absolutely. The intelligence community as a whole would agree to that.

Senator **WARNER**. Senator Nunn?

Senator **NUNN**. I am having difficulty, Mr. Chairman, deciding what is unclassified and what is not.

Senator **WARNER**. We are going into classified session, but it is the intention of the Chair to try to share with the American public to the extent possible the importance of this program.

Senator **NUNN**. I agree with that.

Mr. Secretary, if any of this requires a classified answer, just indicate and I will withhold it.

HARDENING OR SUPERHARDENING SILOS

Just in general, what was the reason for not hardening the MX? What was the reason for that decision?

Dr. DeLauer. Not hardening the silos on a temporary basis?

Senator Nunn. Yes.

Dr. DeLauer. Well, I guss it is the Nunn amendment, where we were limited in the amount of money that we can spend on temporarily superhardening silos unless that solution was a permanent solution.

At this stage of the game we couldn't assure ourselves that any money we spent now on a temporary basis was indeed going to be part of our final basing mode. So, in a nutshell, it was the Nunn amendment.

Senator Nunn. In other words, you would still prefer to go ahead with hardening were it not for this congressional act, the Cohen-Nunn amendment, or the Nunn-Cohen amendment, depending on whether you are for it or against it?

I notice that those who are not in favor of it call it the Nunn amendment.

Dr. DeLauer. We have had 8 or 9 months of hard work in regard to the details of emplacing that missile in the Minuteman III holes. We have, through some ingenuity and good engineering, been able to maintain the hardness of the present silos more than we thought when we made the original proposal.

Senator Nunn. I am asking, if there were no Nunn amendment, would you still be advocating superhardening of the silos?

Dr. DeLauer. Probably not.

Senator Nunn. Probably not?

Dr. DeLauer. Probably not, at this stage of the game.

Senator Nunn. You really have evolved in your thinking to the point where you generally have concluded that superhardening would not be feasible even if Congress had not acted at all?

Dr. DeLauer. Feasible but probably not cost-effective in the temporary mode.

Senator Nunn. It might be feasible, of course, in connection with an ABM and you understand the intent of the amendment was not to exclude that at all?

Dr. DeLauer. As a matter of fact, it was explicit; it said if it were part of a permanent solution it was perfectly OK to go ahead and spend the money, as we understood it.

Senator Nunn. So you really have changed your position as of last year, have you not?

Dr. DeLauer. No; I can't say that we have changed our position.

If you remember my testimony with you and with the Secretary, we said we were studying superhardening. As a matter of fact, one reason we had the Titans in the suggestion was because indeed we could look at superhardening as a basis for doing it without being in violation of any existing SALT agreement.

Senator NUNN. Last year you were going to superharden on an interim basis. This year you are not. It seems to me you have changed your position.

Dr. DELAUER. Again, I will be explicit. I said we were going to consider superhardening as an option and we presented that to you. As a matter of fact, you, yourself, talked to me about the question, how do you know how hard it is to be; what does it buy you, and what is it going to provide us for survivability?

We had discussions about the fact that I had to look at the soil conditions. I had to look at what the rattle space might be, and all the details of engineering. We were not that far along.

Senator NUNN. What you are saying, as I understand it, is that last year you were presenting it as an option, not as a fait accompli?

Dr. DELAUER. That is right.

Senator NUNN. You have received other information; you have looked at new facts and so forth, and you have concluded that superhardening on an interim basis is not the way to go?

Dr. DELAUER. Particulary with our being proscribed from doing that, yes.

Senator NUNN. The question is: Was it the congressional action that made this decision, or if we were to repeal that would you then be advocating superhardening? That is the question.

Dr. DELAUER. I don't know.

Senator NUNN. So you didn't arrive at this decision as an independent judgment then; you simply followed the congressional hint; is that correct?

Dr. DELAUER. Yes, sir.

Senator NUNN. Now, it seems to me you reversed what you said a minute ago. I thought you said a minute ago you would not superharden?

Dr. DELAUER. I said from what I know and what we have done on the interim basing, with the expense that was invovled, first we would come up with a recommendation to the Secretary that we go ahead on the path we are on right now.

Senator NUNN. Independent?

Dr. DELAUER. Independent.

Senator NUNN. OK. Thank you.

Again, I don't know whether this is classified. Let me take a try.

Senator WARNER. Do you want to take a few minutes, Senator, and we will go to others, and then come back to you?

Senator NUNN. Let me ask staff here.

Senator WARNER. Go ahead, Senator Quayle.

Senator QUAYLE. First, I would like to make a comment, a general observation, on this classified and nonclassified aspect.

What we want to do is get as much information before the American public as possible, because it makes the defense budget and defense buildup that is necessary believable.

I had a recent experience with a speech I made on the floor of the Senate on chemical warfare. They said one fact was classified and it was deleted. It was one of the important facts I wanted to reveal. I would encourage you and others to work as much as possible to declassify information so that we can talk about this. The top secret here makes a lot of sense and I know if you are going to err you want to err on the side of preserving security.

It seems to me that the problem we have on classified and nonclassified is very confusing. When we get back and start talking about this to our constituency, the more information we can have, believe me, will be better.

Dr. **DeLauer**. I know, Senator, as far as information for you, we will give you all of it.

Senator **Quayle**. I realize that, but there is a constituency that we have to inform.

Dr. **DeLauer**. That is a different question.

Senator **Quayle**. It is a different question. I would urge a movement in the direction to declassify as much as possible. I understand, as I said, that you would probably err on the side of classified. From my brief experience here on the chemical warfare, I am shocked at some of the things that are considered classified for reasons I really don't know or understand, but it has the stamp on it.

That is just a general comment which was underscored this morning in trying to determine what is classified or unclassified when we are trying to talk to our constituents on this matter, and trying to promote national defense.

CARIBBEAN THREAT

This is the question I have: All the attention is being focused on the Caribbean—Cuba, El Salvador, and Nicaragua. Do you see a potential threat to our strategic forces, a new potential threat to our strategic forces in the United States because of what is going on now, particularly in Cuba?

Dr. **DeLauer**. There is no question about it. More assets are being deployed in the Western Hemisphere, particularly in the south. I made it clear to you when I was over here last year when we talked about the whole question of the defense aspects of our strategic program, that we are particularly vulnerable from attacks out of the south.

Senator **Quayle**. Do you think this vulnerability is going to increase with the potential destabilization in the south?

Dr. **DeLauer**. It is in such a sorry state right now that I don't see where it is going to end up. I don't think our defenses are going to be weakened. I think the threat will be of a higher level. The more assets they deploy down there, the higher the threat.

Senator **Quayle**. So there is increased threat to our strategic forces by what is going on down in Cuba?

Dr. **DeLauer**. No doubt about it.

ABRV

Senator **Quayle**. There was a story on the decision to move away from the Mark 12A.

Dr. **DeLauer**. To the ABRV?

Senator **Quayle**. Yes, on the MX. In your opinion, is this a mandatory design change that is necessary?

Dr. **DeLauer**. Again, what is mandatory? That is judgment. One of the problems we have—and I think the chairman spent some time finding out about it just recently when he visited Los Alamos and Savannah River—is the question of the availability of critical nuclear material, more efficient utilization of critical nuclear material, and the whole question of safety.

These are things that we take seriously and we look at better ways to allocate our resources to this.

The ABRV is not a new program; it has been going on since the mid-1970's. It just happens to be the latest configuration that takes into account the things I just mentioned—the better utilization of critical nuclear material, substantially higher yield for similar size, a better packaging approach for a new system like the MX, a little bit better accuracy—and that is consistent with the MX system.

All these things dictated the fact that we ought to make the choice in this direction and that is exactly what we did.

Senator QUAYLE. What is the additional cost?

Dr. DELAUER. The additional cost is about $800 million for the program.

Senator QUAYLE. $800 million additional cost?

Dr. DELAUER. Yes.

Senator QUAYLE. The $800 million additional cost—and I used the words "mandatory design change"—do you want to say it is a mandatory design change; is it sort of nice to have?

Dr. DELAUER. I think considering the fact of the amount of money we are putting into modernizing the land-based missile systems, that is probably the right amount of money to allocate to the whole question of the business end of the systems.

I think this is a good, effective way, particularly if it forces the adversary to do something that he wouldn't have done with the Mark 12A.

Senator QUAYLE. Which is what?

Dr. DELAUER. He would probably have to put more resources into his forces in order to be more survivable.

Senator QUAYLE. We are focusing him to be more survivable?

Dr. DELAUER. When you go classified, I will give you some numbers.

Senator QUAYLE. I understand that the laboratory that was supposed to bring in the new warhead has not produced one in 10 years.

Dr. DELAUER. That is erroneous. If you look back through the history of weapon development—and you are talking to a guy who did it when I was a military staff member at Los Alamos and when I was program manager on the ICBM's—it was a distribution of labor between two national laboratories, one Livermore National Laboratory and the other Los Alamos.

If you look at the weapons over the full spectrum of our stockpile, you will find over the years there was an ebb and flow in who was doing development.

Senator QUAYLE. It was a reasonable allocation?

Dr. DELAUER. It was a reasonable allocation.

If you look at the contactors that provide the reentry vehicle, which is not the warhead itself, it has been divided between three contractors. Two are well known. They are AVCO and G.E. The third is not well known. Lockheed is an RV contractor as integrator and prime for the fleet ballistic missile systems.

Those three contractors are the ones that contain the capability to be able to do this.

One of our jobs is to be sure we don't lose that capability. Therefore we look at the whole question of the front end of the MX, the existing Minuteman, the new D–5, and the C–4. We are rationalizing exactly how we will handle the reentry vehicle program in the United States. That is underway right now.

Senator **Warner**. Mr. Jones, do you have any comments you wish to add?

STATEMENT OF MR. T. K. JONES, DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING (STRATEGIC AND THEATER NUCLEAR FORCES)

Mr. **Jones**. Could I mention two more items relating to the cost of the ABRV, Senator? First we need a more effective fuze. Then there are some mandatory safety needs that we believe are very, very crucial to the MX program because of the possibility of mobile basing. The Mark 12A would have to have some safety features added to it if we were to use it. These would have added about one-quarter billion dollars to the Mark 12A program. There is some degree of technical risk that it would not perform well as a result of the attempt to make it safer.

So, when you take into account what we would have had to do to the 12A to meet fuzing and safety goals, and the amount of or alloy saved we find that the cost difference between the ABRV and the 12A is pretty nominal. It is between $100 and $150 million.

Senator **Warner**. Dr. DeLauer, we are anxious to get into our executive session. We want, however, to afford our other colleagues an opportunity.

U.S.-SOVIET STRATEGIC BALANCE

Senator **Nunn**. Mr. Secretary, in your written testimony you state that the Reagan program for strategic force modernization will reverse the adverse trend in the United States-Soviet strategic balance and reduce—and I don't know whether this is classified or not, so I will just say—reduce substantially—I don't know what the number might be as far as classification—reduce substantially the U.S. margin of inferiority that would have existed in 1990 under the previous program.

Do you mean by the previous program the Carter administration's program?

Dr. **DeLauer**. That is the one we meant, yes, sir.

Senator **Nunn**. That implies very strongly we are still going to have a margin of inferiority in 1990 but less of a margin by substantial amount than we would otherwise have had; is that correct?

Dr. **DeLauer**. As I mentioned in my opening statement, we do not expect to completely redress the strategic imbalance. What we are planning to do is to provide sufficient survivability and sufficient endurance so that a deterrent capability exists. That is our objective.

Senator **Nunn**. Is that measured against the measurement that was in existence, that we have been working with these 3 or 4 years, is that measurement of inferiority and so forth against the measurement of 1977, or how are you measuring this question of inferiority? What is your base point?

Dr. DeLauer. T. K. has some details.

Mr. Jones. I cannot speak for the measures that were used by the previous administration, Senator, but in trying to characterize the balance, we recently assembled analytical results from the Joint Chiefs of Staff, P.A. & E., that done by our own office and that done by Air Force studies and analysis. Although the models in each case were somewhat different and the scenarios were different, there is one point that was quite clear. There is a very serious degree of inferiority in the U.S. forces vis-a-vis those of the Soviet Union.

Senator Nunn. No matter which measurement you use?

Mr. Jones. That is correct.

Senator Nunn. Which one is the administration using as its baseline?

Mr. Jones. We are using various ways to measure it, both after a Soviet attack, and at the end of an exchange where we have retaliated against their strategic forces in kind.

ESSENTIAL EQUIVALENCE

Senator Nunn. What is your baseline for essential equivalence; what do you go back to?

Mr. Jones. We make several different measurements. We consider the number of warheads, the number of delivery vehicles, the destructive capability, equivalent megatonnage, and hard target kill capability.

Senator Nunn. The old baseline was 1977 and it was based on a Presidential directive issued. Have you changed that or do you have a different baseline for this administration?

Mr. Jones. The baseline forces are the forces that the previous administration had put in its plan at the time it left office, versus the forces that are planned by this administration.

Senator Nunn. The Carter administration defined essential equivalence as having existed in 1977. That was their baseline. That was their assumption. Do you agree with that? If not, what is your baseline of when essential equivalence did exist, if you have such a baseline?

Mr. Jones. We were certain when we brought back the SALT I Agreement in 1972 that we were at parity with the Soviet Union.

It is well known, as the DIA and the CIA have pointed out over the years, that the Soviets have been investing more than twice what we have in strategic forces; therefore, whatever essential equivalence might have meant, it was not parity.

Senator Nunn. In 1977 it was not parity, in your view?

Mr. Jones. It was definitely not parity. Frankly, sir, I can't find any way to stretch the English language to tell you that what exists today is equivalent, essentially equivalent, or anything remotely resembling equivalence.

Senator Nunn. You won't get any disagreement out of me on that point.

What I am trying to get to is that we don't have any way of measuring now. We have heard talk about the "window of vulnerability" for the last 2 or 3 years. It was a major issue in the last Presidential election. To my knowledge, the only analytical bases for that that I know about, was the SAC basis, and they used 1977 as the baseline for essential equivalence. Now you are telling us that you no longer use that; is that right?

Mr. JONES. Sir, the way we have run it, we have plotted the trends year-by-year from the mid-1960's, projected out through the 1990's.

[Additional information follows:]

STRATEGIC FORCE ANALYSIS

I would like to provide some comments which may clarify this point.

My understanding of the "1977 baseline" was that it was established as a mark beyond which we would not allow deterioration of the strategic balance. Analyses which omitted the Soviet Backfire and did not account for the lack of endurance in U.S. C^3 and forces showed that we were near parity at that time. My analysis, which accounts for these factors showed that we were inferior in 1977 and that under the previous program that inferiority would have worsened until 1986.

Our baseline is parity and conditions of strength less than parity we refer to as inferiority.

Senator NUNN. Have you seen the SAC analysis?

Mr. JONES. Yes, sir, I have.

Senator NUNN. Is that part of your deliberation or has that been discarded, or what is the status of that SAC analysis?

Mr. JONES. We take that into account and their results are not dramatically different from ours.

Senator NUNN. Mr. Chairman, we asked for the SAC analysis as part of this hearing because that is the thing that we have had every year. I was one of those very critical of the gap that it opened up in the previous administration, so I am not coming to this from any point of view, I hope, other than objectivity, but this year we didn't get that.

General Davis did not submit that. It is my understanding that that analysis may have been abolished in SAC.

Now we are hearing that the new administration is going to make 50 percent more improvement than the previous administration by 1990, which directly conflicts with General Davis' testimony before this committee last year, where he indicated, at least he might not have used the 1990 date but used the 1984 or 1985. All I am trying to do is use some standard of comparison that is constant between administrations.

Dr. DELAUER. That may be hard to come by, sir.

Senator NUNN. Not if you use the SAC analysis. That was not a Carter analysis; that was a SAC analysis. Are you using that, and has anyone in the administration told SAC to cancel that analysis?

Dr. DELAUER. We have not.

[The information follows:]

SAC'S COMPARATIVE FORCE ANALYSIS

The following information has been provided by SAC.

SAC's analysis of the comparative strategic balance has not been abolished. In fact, they are currently updating their model to incorporate new strategic doctrine.

Their latest complete analysis of the Reagan Force is synopsized in the document submitted during testimony on 4 November title "Comparative Strategic Force Analysis." This document compares the relative contributions of the Carter and Reagan Forces using dynamic measures of military damage expectancy (MDE) and residual weapons. With the exception of very minor changes in the planned Reagan force structure, their assessment of relative U.S. and Soviet warfighting capabilities has not changed from the balance depicted in the 4 November submission.

SAC will continue to update its analytical model to reflect our strategic modernization programs and doctrine. They will certainly provide an updated analysis when it is completed.

Senator **Nunn**. Is it all right with you if we get the SAC people to update it, whether we use it or not but at least have a baseline?

Senator **Warner**. The Senator's point is well taken. The record should reflect accurately the responses of both you and Mr. Jones. I think there was overlapping.

Dr. **DeLauer**. Senator, you don't have a quarrel with me on that. I think we ought to establish a baseline. It ought to be discussed.

I have been using as a baseline for the things I have been reviewing and advocating, the whole question of surviving capability. The minute you use that as a criterion, then you certainly have to bring into account what T. K. has talked about—what is the scenario? What do you expect from the adversary? What is the level of understanding of their capability? How will it be employed? And so forth.

I think we do have a good model and we ought to present that model to you, and we ought to continually use that as the model which we do our deliberations on.

Senator **Nunn**. I don't have objections to changing the model. There may be more relevant models. I would like at least to compare the new model to the old model.

Two of the key elements in the old model that SAC was using was military damage expectancy. I would like for you to give us in the new model the military damage expectancy as of 1989, which was the old SAC analysis, and as of 1990, which, I believe, you peg yours to. I would like the same thing for the residual weapons as of 1989 and as of 1990.

Then, what I would also like—and this can come from SAC because all they have to do is plug it in—is to get their chart as computed in previous years and give us the 1989 and 1990 analysis there. Then we will have both of them, side by side, and we will see, if they do differ, where we differ; we will have a way of making judgments.

Dr. **DeLauer**. You had General Davis here this morning?

Senator **Warner**. That is correct. We did not address this point.

Dr. **DeLauer**. If you can have the staff address that to him so that at least we are working together——

Senator **Nunn**. I will. I could not be here. I had another meeting this morning. I was going to ask General Davis.

Senator **Warner**. He returns Friday. I will make certain that this point is taken up.

Dr. **DeLauer**. We will get in touch with him in the meantime.

Senator **Warner**. The Senator's point is well taken.

Mr. Jones, go ahead.

Mr. **Jones**. I would like to make one or two observations.

I fully concur with your concern, Senator Nunn. I feel you should have a broader range of data than you have historically been given on this subject.

We have found, in assembling analyses from different parts of the Defense Department, that looking at the results of more than one model is useful. I believe we should probably provide you with that.

The second observation is that I think for your purposes we should probably provide you with not just a snapshot of one point in time but the trends from here forward, because our concern is not just how do we look in 1989 or 1990 but how do we hold off the Russians until that date.

Senator **Nunn**. I agree.

Mr. **Jones**. We should give you that.

[The information follows:]

Strategic Balance

The paper on the strategic balance is being submitted separately and will be held in committee files due to its classified nature.

The second point I might make is that we are continuing to learn more and more about what the Russians are doing. We have, in response to Senator Quayle's point about declassification, succeeded in declassifying the fact that evidence supports the Soviets exploitation of reloading their silos. That is a factor we have not been taking into account in our analyses and I believe in all fairness we must. Either that or we have to come up with a way to credibly counter their reloads in a military sense.

You also mentioned damage expectancy. Certainly, that is a most important parameter that we have to take into account, but I think in the classified briefings you will get from DIA you will find the Soviets have gone much farther than we thought they would in protecting crucial assets. The reduced damage expectancy against these assets would figure heavily in our deterrent.

You will recognize that whatever might have been the baseline in 1977 is going to change as we learn more and more about what the Soviets are doing.

Senator **Nunn**. I agree, there has to be flexibility in here. We just need to have some common source at least as a beginning point. I don't think there is a simple way to measure this whole thing. It is complex.

I like the survivability measure more than anything else.

Dr. **DeLauer**. We do, too. That is deterrence.

Senator **Warner**. Senator Levin?

Senator **Levin**. Thank you, Mr. Chairman.

INFERIORITY GAP

Just to follow up that point briefly, General Ellis' answer for the record last year relative to the point by Senator Nunn was that "with the preliminary calculations I have seen, we will have a slight decline in the balance adverse to the United States beyond that which was in the Carter program." That is his comparison of the Carter/Reagan programs. It confirms what Senator Nunn told us in terms of the SAC comparison of the two programs.

Let me ask you, Mr. Jones, about the trends that you plotted year-by-year in the strategic comparison. When is the inferiority gap the widest?

Mr. JONES. The inferiority gap was widest in 1986. Under the present program we have been able to level it out, starting about 1984, so it will not get worse beyond that.

Senator LEVIN. Is the gap wider because of the retirement of the Titan missiles?

Mr. JONES. No; it is not.

Senator LEVIN. Why?

Mr. JONES. If we were concerned about megatonnage, which is about all that one can say is the useful character of the Titan, we should have been concerned about that starting in 1974, because that is when the Soviets surpassed us in megatonnage.

In deployed megatonnage, they presently have about a 3-to-1 advantage over the United States. In the light of that disadvantage on our side, the presence or absence of the Titan is inconsequential.

Senator LEVIN. You are saying there is no difference in terms of the gap, whether we have the Titan or don't have the Titan?

TITAN LACKING IN SURVIVABILITY

Mr. JONES. The Titan is so lacking in survivability that it does not contribute materially to our security; it certainly doesn't contribute enough to be worth what it costs us to keep it. We looked at that in terms of its cost versus how much it contributed to our security and felt that it was better to put that money into something that would do us more good in terms of security.

Senator LEVIN. I understand we will be getting into the whole Titan retirement question on Friday. You are saying the Titan does not even appear on your chart. You did not add in the numbers?

Mr. JONES. We added them in.

Senator LEVIN. When you take them out, doesn't it have an effect?

Mr. JONES. If you did it with a very, very sharp pencil, sir, you could barely see it in terms of surviving useful capability.

Senator LEVIN. In terms of megatonnage, I gather it would make quite a difference on the chart?

Mr. JONES. In terms of deployed megatonnage, it would have made some difference, but that is an area where we are behind by 3 to 1 and we have made a conscious decision not to try to duplicate the massive weaponry of the Soviets. That would be inconsistent with the President's goal of reductions.

I am sure you will find some comfort, Senator, in noting the difference between the two programs; in terms of the number of nuclear weapons we deploy, it is negligible.

What we have focused on is making those weapons survive.

STEALTH

Senator LEVIN. Mr. Secretary, General Ellis told us last year that he did not see major—and I am quoting him—major design problems which would put the Stealth bomber effort in the high-risk category. Do you agree with him?

Dr. DELAUER. No; I disagreed with Dick Ellis then, and now that we are further into it I would disagree even a little bit more, but for a different reason which I can get into in classified session.

Senator LEVIN. You disagreed with him on that assessment?

Dr. **DeLauer**. Yes.

Senator **Levin**. Nothing has changed since?

Dr. **DeLauer**. Nothing has changed my mind.

Senator **Levin**. Has the IOC for the Stealth bomber slipped?

Dr. **DeLauer**. No; it has not slipped.

Senator **Levin**. If we decide to drop the MX missile from a plane instead of configuring it on the ground, are we going to have to redesign it?

Dr. **DeLauer**. The missile?

Senator **Levin**. Yes.

Dr. **DeLauer**. We are not intending to.

Senator **Levin**. To redesign it?

Dr. **DeLauer**. We are not going to redesign the missile.

Senator **Levin**. The missile that we are presently building will be used without any redesign regardless of the basing mode?

Dr. **DeLauer**. Yes, sir; that is correct.

Senator **Levin**. I want to go back to Mr. Jones. If the window of vulnerability is greatest in 1984, would we be better off right now if there were a freeze, as some are proposing, on the deployment of any additional missiles, warheads?

Mr. **Jones**. As you probably know, Senator Levin, I spent 3 years trying to negotiate arms limits with the Russians. I find some serious problems in what it is that these people are talking about freezing.

My concern with SALT II is that it does not limit arms. The Soviets can have an unlimited number of missiles. Is what is to be frozen just launchers with continued allowance for the Soviets to build as many missiles as they want?

Senator **Levin**. Let me read the proposed language.

> The freeze that some are proposing is a freeze where both countries agree to halt immediately the testing, production, further deployment of nuclear weapons, missiles and delivery systems in a way that can be checked and verified by both sides.

Assuming checks and verification are possible, would such a freeze now be of assistance to us, since we are going to be worse off in 1984 than we are now?

Mr. **Jones**. It would freeze us in a position of inferiority. It would prevent us from being worse off in 1984 than we are now.

On the other hand, it would also prevent us from being better off in about 1987 or 1988 than we are now. But the "if" that you pointed out—and correctly, Senator—is a very large "if", if we can verify.

There is an additional "if" and that is, how do you entrust your security to a nation that has demonstrated its willingness to violate arms control agreements?

[Additional information follows:]

Arms Limitations

This freeze proposal ignores one of the hard lessons that we should have learned during the last 10 years of arms control negotiations with the Soviets—that they keep building while we talk. The likely outcome of the freeze negotiations is that the Soviets would talk until we reached the point of maximum inferiority, the point at which our new initiatives could start to close the window of vulnerability, and then they would accept the freeze.

Senator LEVIN. I am not willing at all to do that. It says checked and verified. It is not my willingness, nor, I presume, their willingness, to talk about check and verification.

Going back to the 1990 date, when you say we will still be inferior to the Soviets, can you tell us whether or not we will be relatively more inferior in 1990 than we are now on your two trendlines?

Mr. JONES. In 1990, at worst, we would be at about 40 percent of the disadvantage of the previous program.

Senator LEVIN. My question was not clear. I don't want to compare two programs. We will save that for some material from SAC.

What I am interested in is comparing where we are now on the trendline.

Mr. JONES. We will be half of what we are now.

Senator LEVIN. Half of the inferiority will be removed?

Mr. JONES. That is right.

Senator LEVIN. We will be somewhat better off in 1990 than in 1981?

Dr. DELAUER. The half is a large half; it is not just somewhat.

Senator LEVIN. I meant to say we will be half as bad off relatively in terms of that margin of inferiority in 1990 as we are now.

Mr. JONES. That is right. If we are successful in deploying, before 1990, more survivable basing modes for MX—and there are at least two of those that could reach deployment before that date—the remaining inferiority would be very small.

STRATEGIC BALANCE UNSTABLE

There is another element which I believe is equally important, Senator, and that is, that the strategic balance is presently unstable. There is an incentive for surprise attack that is growing rather quickly. We would similarly be able to get rid of almost all of that by 1990.

Senator LEVIN. Are the B-1 cost and IOC the same now as they were 6 months ago?

Dr. DELAUER. Yes, sir; as a matter of fact, I could have brought—except it would have filled up the car—the first piece of production hardware that has come out of the program.

Senator LEVIN. Does it fly?

Dr. DELAUER. The airplane flies very well.

Senator WARNER. In your predictions as to the vulnerability issue in the outyears, how do you factor into your equation the Soviet position; do they stand still where they are now or are you taking into consideration what they are adding to the inventory? It is not a static situation on one side and fluid on ours?

Mr. JONES. It is by no means a static position. We have taken into account not only the projections of the intelligence community for growth in the Soviet forces and capability, but also, where they apply, we have taken into account their leadtimes and technical capability to lay on countermeasures explicitly directed to our program.

Senator WARNER. At this time the subcommittee will continue its session in executive session.

As soon as the clerk informs the Chair that we are prepared, we will go ahead.

[Whereupon, at 12:30 p.m., the subcommittee proceeded in executive session.]

EXECUTIVE SESSION

Senator **Warner**. Dr. DeLauer, your prepared statement has been inserted in the record. It will not be necessary for you to give it verbatim.

I am anxious for the members of the subcommittee to have the opportunity to pose questions to you. In view of the uncertainty on the floor and the necessity for members to be there perhaps in a short time unless advised to the contrary, it is the Chair's desire to proceed right to the questions and then let Dr. DeLauer have any wrapup that he wishes.

Is there any desire to do otherwise?

Senator **Nunn**. That is fine.

Senator **Warner**. Senator Quayle?

MX MISSILE

Senator **Quayle**. Can you bring us up to date on where you stand on the whole MX situation, the three options, and what is your best guesstimate?

Dr. **DeLauer**. What we have done is to go ahead with the design for installing the MX missile into the Minuteman III silo. We have been able to design it such that it looks like the problem we are concerned about—reduction of its capability in hardness—appears to have been pretty much overcome.

One of the problems we have in answering, corollary to Senator Nunn's question, is that we were afraid that the lack of rattle space of that larger missile in the Minuteman III silo would reduce the hardness to such a degree that it would be vulnerable to the SLBM threat.

I was concerned about the hardness of the Minuteman force relative to the SLBM threat with their present accuracy. As it turns out, we have been able to make the canister installation such that we have been able, by the way we have designed the slippers and support structure within the canister, to recover almost all the hardness that now exists in Minuteman III. I think it is about [deleted] psi. It looks like we will be able to do that.

We have a pretty good handle on exactly what it takes to put MX in the Minuteman III silo.

I have prepared a directive to the Army on what their program should be for the ABM and the work they have to do with the BMD. That directive outlines things they have to look at. One of them is an option that will permit some deceptive basing, either deceptive basing of the BMD or deceptive basing of the missile. This does not necessarily include mobility of the missile but may include mobility of some aspects of the BMD. We have to look at that.

We will also ask the Army to take a good look at what looks like a promising nonnuclear capability. You see, one of the things we are striving for in the defense capability is the fact that if we could indeed end up with nonnuclear kill mechanism, the question of nuclear weapon release is eliminated. That is a very, very high leverage position for us.

One of the real problems this country has—and the Soviets know and exploit it—is the fact that we have a very secure and thorough way of having the National Command Authorities release nuclear weapons. That is one of the reasons we are striving so hard to get this whole question of command and control, of continuity in government and all that sort of thing, put into our capability.

As to the CPA, we have a little problem because we are precluded from spending any money on a CPA. We have about six or seven disconnects between authorization and appropriation.

The authorization conference precluded us from spending any money on CPA, so we have to come over and talk to you about it.

What we intend to do now is come over and request from you that within our in-house funds we allow the Defense Science Board to spend some money to take a good look at the survivability of the CPA. If it provides promise, then we will come over and ask you for authority to spend some funds.

You see, we have the money in the strategic program. We just don't have a line item for CPA. They would not let us spend any of that money. Then we would ask for authority to go ahead and do a reasonably detailed design analysis of whether or not we could build the airplane.

First, we have to know whether it is survivable and we have to get that answer first. I think it is a reasonable compromise and I hope that we can get your approval on that.

Deep-underground—we are pursuing that; that has some limitations on it, too. We don't have the same limitation on that. We have some very promising tunneling techniques. We have some concepts in regard to egress.

We really do hope to have, by June of next year, the solution in hand enough to make a positive recommendation regarding which we would like to do.

Senator **QUAYLE**. June 1983?

Dr. **DELAUER**. Actually, July 1, 1983.

Senator **QUAYLE**. It appears to me that you are heading in the direction of deceptive basing of ABM; is that right or wrong?

LAND-BASED MISSILE SYSTEM

Dr. **DELAUER**. There are two things we would like to do. We would like to have the strength of the land-based missile system with its positive command and control capability and prompt retaliatory capability. That is a positive we would like to have throughout our strategic force. We would like to have the high accuracy. We are going to get the high accuracy in the D-5, but it will be later than the MX.

We are still working hard trying to find out how we can get positive command and control out of the Fleet Ballistic Missile Force. That is still an issue with us. The deep-underground does not provide us that aspect of a deterrent force; it provides us survivability; it provides high accuracy; it does not provide the prompt retaliation.

We certainly are looking to the one that will give us the full spectrum of capability first and work it the hardest.

SOVIET DEFENSE SPENDING

Senator **Quayle**. Let me switch gears. The Soviet Union now spends about 14 percent of their GNP on defense. What kind of intelligence or what kind of information do you have that shows what they intend in the next 5 to 10 years?

Second, will they be able to afford to do that? What is your best guess on what they are going to do on a strategic force basis?

Dr. **DeLauer**. I am not an economist. They certainly have overcome certain economic difficulties in the past. I have seen an economic intelligence briefing. I recommend it to you. They are on a narrow edge. I have dismissed the notion that they will spend anything no matter what it takes. I think that is nonsense.

I think they will go further than we would as far as the economic impact of their defense programs, but I think there is a limit. In my own view, that is one reason we are presenting this program like it is. I want to force them to spend one devil of a lot of money in areas that don't threaten us and bring stability to the strategic balance.

I would like to have them go mobile; it would be great. Then they won't get concerned enough to worry about survivability of their assets and that will lower the threshold. That is what T. K. was talking about on stability, but it will cost them a lot of money to go mobile.

I would like to have them worry about the B-1B with its low radar cross-section, and the ATB following that. What they have to do with a defense system is fantastic. I would love to have them put the money into that. They will sit down and say, "Look, it is just not worth it. We can get the same deterrence posture at the same low level of expenditure. Let us sit down at the table and start regulating arms reductions, real reductions, not just limitations."

But they are not going to do it without being pressed. I think we have them where it is starting to hurt. Yesterday it was their armed forces day. If you read the paper this morning you will see the defense minister was rattling sabers. They will spend anything that it takes to keep strong. That is a good reaction, because I think we are going to beat them on the economics front. We are certainly not going to outmegaton them.

Does that answer your question?

SOVIET STRATEGIC ARENA

Senator **Quayle**. I was curious whether you think they are going to, or will be able to, respond and spend just as much as they want to, contrary to what they say for public consumption, and what kind of intelligence data that you can share with us on what we anticipate the Soviets will do in the strategic arena?

Dr. **LeLauer**. They have a lot of systems they are going to deploy. Jim talked a little bit about the ICBM's. Their whole ship systems are new deployments. They have a new Ballistic Missile Submarine the *Typhoon*. They have a brand new bomber [deleted].

Senator **Quayle**. The [deleted].

Mr. **Miller**. The [deleted].

Dr. **DeLauer**. What we did we put the B-1 on top of it. [deleted].

Senator WARNER. Senator Nunn?

MX MISSILE BASING MODE

Senator NUNN. Mr. Secretary, some people—and I really do not mean to imply people in the Department of Defense—I don't know that I have heard anyone advocate this in the Department of Defense, although I have seen some hints—some people who advocated the current MX, putting MX on an interim basis in existing silos, also stated that this kind of basing mode should be coupled with a launch-on-warning or launch-on-attack kind of concept.

Do you agree with that, or disagree with that?

Dr. DELAUER. I disagree with it as national policy, even though I personally over the years, have studied that option. We have other solutions.

Senator NUNN. Why do you disagree with that? I disagree with it, too.

Dr. DELAUER. There are two things. One, the nature of our political process is cyclical enough that as a long-term strategy it may not hold water. Therefore I think we have to be in a position to provide a force structure and an employment capability to a degree that is immune to the personality of the National Command Authorities. That is my own personal feeling.

On the other hand, we should not be completely free of that concept. I would like to demonstrate that we have that capability, so that indeed the Soviets have to consider it. I have always supported launching out of the old operating bases.

Senator NUNN. Do we have enough money in command, control and communciations improvements to be able to deal on a straight launch-on-attack capability or be able to produce that capability?

Dr. DELAUER. Yes. As a matter of fact, we can do it now if we want to. We have in the past launched out of Vandenberg on an alert from the [deleted] satellite.

Senator NUNN. The information I have had—and I have been briefed on this, but I am a year out of date—is that [deleted].

I have been through every element of the timeframe. My view of it is from what I have seen, unless there have been real improvements, [deleted].

Dr. DELAUER. I said to demonstrate, develop a plan and everything else, and maybe next time we see some test launches being made, we can react to that by launching out of Vandenberg. That we can do. [deleted].

Senator NUNN. You are not advocating that we develop that?

Dr. DELAUER. No.

Mr. JONES. One of the reasons that people have argued that [deleted]. One of the major issues in C^3 and one of the areas that we are focusing our attention on, is to strengthen that system so that it no longer will be [deleted].

Senator NUNN. I agree with that.

Dr. DELAUER. I think we should strengthen all the nodes and things. I think on a nonhardware, nonequipment basis that is a very bad strategy.

LAUNCH-ON-ATTACK POLICY

Senator **Nunn**. Do you think the Soviets have a launch-on-attack, let us say, policy first, capability second?

Mr. **Jones**. They have told us that that is their policy and they have told us that that is their capability.

[Additional information follows:]

Launch Under Attack

I would like to make another point. Whether the Soviets have a launch under attack capability or not, it serves the interests of their strategy to tell us that they have it. The reverse is also true, as such a capability creates uncertainty in a potential attacker's planning which strengthens deterrence.

Senator **Nunn**. Do you believe they really have that capability?

Mr. **Jones**. I would defer for the details to the DIA witness.

Mr. **Miller**. [Deleted.]

Senator **Nunn**. Isn't that capability less than ours in terms of warning time than before?

Mr. **Miller**. [Deleted.]

Senator **Nunn**. Do you really believe they are using this launch-on-attack policy to deploy as a more or less demonstration what Dr. DeLauer would like us to do, or do you think they seriously believe they have the capability to detect and react in time to launch under attack?

Mr. **Miller**. [Deleted.]

Senator **Nunn**. With certainty?

Mr. **Miller**. Yes, sir.

Senator **Nunn**. [Deleted.]

Mr. **Miller**. Yes.

Dr. **DeLauer**. [Deleted.]

Senator **Nunn**. Not with certainty. There is a difference between preliminary indication and having the President release authority. There is a large gap from the first time somebody sees something on radar and the time the President says fire the missile. To have that kind of policy you have to have the President make the decision to release.

Dr. **DeLauer**. I rest my case. That is the process. We can [deleted].

[Deleted.]

Senator **Nunn**. Would you much prefer they not have a launch-under-attack policy?

Dr. **DeLauer**. I don't want anybody to have a launch-under-attack policy.

Senator **Nunn**. You don't want us to have one either?

SURVIVABLE CAPABILITY

Dr. **DeLauer**. No. I want survivable capability so that it makes no difference when you launch; you have some left over and you get rid of this crazy business.

Senator Nunn. You say in your statement you would like to see them move in the direction of more survivable——

Dr. **DeLauer**. Absolutely.

Senator Nunn. Do you worry about the gap in the period of time, taking your statement completely in good faith, in which we are going to come up with a survivable basing mode, do you worry about our putting an accurate missile like an MX in an existing silo which everybody knows is vulnerable, coupled with the command, control, and communications, do you worry about the effect that may have on the Soviet Union as to whether they think we have given up on an ICBM survivability and therefore they should not move in that direction?

Dr. DeLauer. I think if we had a complete decision to deploy all of them, that is why I think the partial deployment is in that direction, but——

Senator Nunn. You would worry——

Dr. DeLauer. On the other hand, if there really were a preemptive capability that they were worried about, Minuteman is a very good force.

Senator Nunn. You mean the Minuteman III could go after them on first strike?

Dr. DeLauer. Yes; it could be perceived as having that capability.

Senator Nunn. Why do we need the MX then?

Dr. DeLauer. As they get harder, which they are doing, and as they tend to harden targets other than their ICBM force, and as some of their other assets that they are very protective of get dispersed, get mobile, we would like to have a higher accuracy and a higher yield than we do with the Minuteman.

MX VERSUS MINUTEMAN CAPABILITY

Senator Nunn. Could you furnish for the record an analysis of what the MX will be capable of doing compared to the Minuteman with improved warhead?

Dr. DeLauer. Yes.

Senator Nunn. We probably have that somewhere.

[The information follows:]

Comparison of MX and Minuteman

The MX missile will provide two major operational advantages over Minuteman: it will be more accurate, and it will carry ten RV's instead of 3. The MX CEP requirement is [deleted] but the goal is [deleted]. An integrated fuze will give it an effective CEP of [deleted] if the actual CEP is [deleted]. In comparison, the MM-III CEP is presently about [deleted]. An improvement program is underway which might bring it to the [deleted] range. An optimistic assessment of upgraded MM-III performance assumes a combination of improved accuracy and a path length fuze (PLF), neither of which are now in the program, to give an effective CEP of [deleted].

The kill probabilities against modern Soviet silos for these various possibilities are shown in the following table:

	Yield	CEP	P_k	P_k With PLF	Number of targets—	
					Booster	Booster with PLF
MX			[Deleted]			
MM-III			[Deleted]			

It can be seen from the table that the MX booster with the [deleted] CEP is more than [deleted] times as effective as the MM-III booster having the best projected accuracy. It is important to note that it achieves this performance with only [deleted] than the MM-III booster requires.

Mr. JONES. I could add two or three points that bear on your line of questioning:

First, as to the Soviet belief that they can launch under attack, from private conversations I had with the Soviet military while I was on SALT, my impression is that they believe because of our open society they would have considerable knowledge of any impending U.S. attack before it showed up on the radars.

Senator NUNN. Then that changes the whole definition of launch under attack?

Mr. JONES. Yes.

Senator NUNN. That is not a bolt out of the blue, bang, here it is, surprise, wake up in the night; it is a stabilizing concept.

Mr. JONES. It is also unequal between the two sides. They have more visibility than we do.

Senator NUNN. Right.

SOVIET SURVIVABLE ICBM BASING

Mr. JONES. The second point is that there are some indications that the Soviets are moving toward survivable ICBM basing. It is in our interest to move them that way. Dr. DeLauer has been most eloquent in pointing out that we have to get the Soviets investing in survivability. It goes back to the stability questions that I raised earlier. The strategic relationship is unstable and we have found in our force structure development that we could not unilaterally eliminate the large amount of instability that now exists. We have got to move the Soviet ICBMs into increasing their survivability if we are to get the relationship back on a more stable basis. I believe that deploying the MX will nudge them into that mode much quicker than we could otherwise.

A further benefit of having done that is that it will be easier and less costly for us to get survivable ICBM deployment in future years in our own country.

Senator NUNN. I agree with all of those points. The only thing I see as a very large risk is that interim basing mode of the MX in a nonsurvivable mode.

MX INTERIM VULNERABLE BASING MODE

You are putting in a more accurate, more dangerous threat to them in the same degree of vulnerability that exists now. If they were to conclude different from what we hope they conclude, that is, if they conclude we are not serious about a permanent basing mode being invulnerable and we are going to continue in that posture, then we could very well conclude, combined with the C^3 improvement, that we are indeed going into a launch-on-attack situation which could discourage them from going into a survivable system and move them more from their definition of launch under attack, which takes into account our open society, to our definition which is bolt out of the blue, in which case we would have made a dramatic move toward lowering the nuclear threshold on both sides.

That is what worries me about deploying MX in 4 or 5 years in a vulnerable position.

Dr. **DeLauer**. Two points. One, the question of utilization.

There is no question that putting MX in a Minuteman silo with positive command and control is better than putting it in the warehouse, as the Secretary keeps saying, from a deployment standpoint but not from a survivability standpoint. As a matter of fact, it is very unsurvivable, no matter where we put it, in our present society.

Wherever we store them, they are vulnerable. What T. K. is pointing to is that limited deployment by us provides capability. Also it lets us learn more how to handle it. I can't disagree with your broad concept whatsoever.

Senator **Nunn**. I think it is an extremely important thing that there be a very concerted effort in the Department of Defense, more so now that we have this interim vulnerable basing mode than before, to discourage any hint that we may be going to a policy of launch under attack.

I have seen hints, I have seen several things that strongly hinted we were.

I am not one that wants them to know for all certainty that we never would do that, but it is a different thing from having that as a policy. Every time I see a statement that indicates we may be going to launch under attack from anybody in the Department of Defense and then combine it with this vulnerability and C^3 improvement causes me to have a few sleepless nights.

Dr. **DeLauer**. I understand. I could not get that measure across when I talked about superhard. The superhard desire was toward survivability. You know, we got into a who shot John thing the last time. People were saying it was not cost effective and how survivable was it. I would like to have everybody embrace and say "terrific" and we go and superharden.

Senator **Nunn**. The only problem was when you were advocating, we had DIA and CIA reports saying it would not work.

Dr. **DeLauer**. Again, as you pointed out, we have things to do.

Senator **Nunn**. You have to get everybody in on the conspiracy.

Dr. **DeLauer**. Again, we are talking about a deterrence. Half of it is up here.

Senator **Nunn**. I know, but we have to get everybody moving.

Senator **Warner**. I want the members of the subcommittee to take full notice of the indulgence of the Chair today in allowing members to pursue questions. I will put mine in for the record, to meet our 1 o'clock deadline. I have been very interested in the dialog we have had today.

LAUNCH-UNDER-ATTACK THEORY

What is the threshold of the destruction we would endure in this launch-under-attack theory? How do you go through the decision process of whether or not we would retaliate?

Dr. **DeLauer**. All this ties in with the fact you have to make this thing work in order to make it credible. If you do not make it work, you have lost deterrence. There lies the philosophical point. I don't talk megatonnage. I don't talk installing. I talk survivability and deterrence.

You wanted to deter. If it never happens, it is well worth the money. It is our job to see that it never happens. That is what we are trying to do.

Senator **Warner**. We have a big year ahead of us. Do you think you can accelerate that June 1983, date? That bothers me.

Dr. **DeLauer**. We had a heck of a time to try to get everybody to agree to let us do the studies that we have to do to answer the question.

Senator **Warner**. We had better close now while we are ahead. Additional questions will be submitted to you to be answered for the hearing record.

[Questions with answers supplied follow:]

Question Submitted by Senator John W. Warner

SILO BASED MX AND STABILITY

Senator **Warner**. You may have left, inadvertently perhaps, the impression in your testimony that the deployment of a number of MX missiles in non-superhardened silos could result in a strategic balance less stable than the present by virtue of the fact that these missiles would pose a counter-force capability which we would either use or lose in an attack. It might also have been inferred that such a situation would encourage the Soviets to develop less survivable—rather than more survivable—strategic weapons of their own. Would you care to comment and clarify the record as might be necessary?

Dr. **DeLauer**. Those impressions are not the correct ones and this is a welcome opportunity to clarify the record. Everything we are planning and saying should be understood against the background of our comprehensive and mutually reinforcing strategic forces modernization program and the forces we have in-being. The former assures long-term deterrence and stability while the forces in-being provide sufficient temporary deterrence and stability to permit us to restore our eroded counterforce capability quickly by interim deployment of MX in non-superhardened silos. In addition, stability is served by Soviet knowledge that we are spending significant resources and time in pursuit of a truly survivable basing mode for MX. The Soviets are also well aware, to the benefit of stability, that 40 MX missiles do not constitute a real first strike threat to them. Furthermore, they have always had to contend with the option we reserve to launch under attack, and we believe his uncertainty on that point contributes to deterrence. Introducing MX into that situation merely puts more "bite" into the option. Turning to the second erroneous impression, we are convinced that restoration of our counterforce capability will cause the Soviets to shift significant resources away from the destabilizing proliferation of offensive weapons into survivability improvements. Alternatively, or in addition, they might decide to seek meaningful strategic arms reduction talks with us. Either outcome would be welcome because of its stabilizing effect.

EVOLUTION OF MX SILO BASING PLAN

Senator **Warner**. Secretary DeLauer, in your colloquy with Senator Nunn concerning the evolution of the MX interim basing proposal, you indicated that the currently favored system involving the deployment of 40 MX missiles in non-superhardening Minuteman silos was the product simply of refining the plan originally announced by President Reagan, rather than a change imposed as a result of congressional action. Would you elaborate the history of development of this proposal and clarify for the record the degree to which various technological, economical and legislative factors were involved?

Dr. **DeLauer**. The reality of this situation is that the thrust of the MX program remains unchanged from that announced by President Reagan on October 2, 1981. The program has been evolving since October as a result of valuable dialogue with the Congress and continuing DoD development. The principal focus of this MX program continues to be the three long-term basing options of deep basing, continuous patrol aircraft (CPA), and ballistic missile defense (BMD). One significant result of the dialogue with Congress is that the BMD option will include the important sub-options of superhardening and deceptive basing, both of the defensive units and the offensive missiles.

The original announcement said that the initial, temporary MX deployment would be in Minuteman or Titan II silos reconstructed to provide superhardness. During the congressional review of the fiscal year 1982 budget, the dialogue on temporary basing carefully considered the effectiveness of the superhardening feature and its costs. The result was legislation that prohibited the use of all but $20 million of the fiscal year 1982 funds for superhardening and accelerated the decision date for selecting the long-term basing mode of July 1, 1983. The legislation, known as the Cohen/Nunn Amendment, allows us to continue with our original plans for a possible permanent deployment in defended hardened silos. Based on results of an Air Force study that included consideration of some 20 factors, we issued direction on December 30, 1981 to base the first 40 MX missiles in Minuteman silos as the more cost-effective solution. There were four primary reasons for our selection of Minuteman silos: (1) their spacing is more compatible with BMD deployment, (2) they provide more flexibility for future expansion of the system, (3) they maximize operational effectiveness for MX, and (4) they permit deploying in one wing, which minimizes C^3 problems, avoids duplication of facilities, and significantly reduces costs.

We are continuing to work with the Congress on this critical defense program and are, of course, complying with Congressional direction to the best of our ability. The program has evolved, as it should, to reflect the direction received from Congress in the 1982 funding legislation. For anyone to portray this orderly and constitutional evolution of the President's program as important reversals or departures from the President's strategic plan is neither constructive not accurate.

C^3 IMPROVEMENTS

Senator **WARNER**. The President highlighted the importance he attached to upgrading our C^3 capabilities in his announcement last fall and you have underscored this priority in your statement this morning.

Is this priority reflected in the President's fiscal year 1983 budget request and, to the extent that Congress sees fit to reduce that budget, to what degree should reductions be made *or avoided* in strategic C^3 modernization programs?

Dr. **DELAUER**. President Reagan, in his strategic modernization announcement of October 2, 1981, assigned first priority to upgrade of the strategic C^3 system. That priority is sustained in the budget request for fiscal year 1983. $1.84 billion, or well over half, of the $2.87 billion request is for investment in new and reinforced capabilities.

The strategic C^3 system is an absolutely essential link between our policy and plans for deterrence of nuclear conflict and the forces required to execute the plans and thereby implement the policy. Any perceivable weakness in the strategic C^3 system erodes the credibility of the deterrent. Last year, testimony from senior military and civilian officials identified a number of [deleted] deficiencies [deleted], and with the help of the committee, we initiated several efforts to correct these. In fiscal year 1983, we are continuing these efforts and undertaking new initiatives to assure that the strategic C^3 system will indeed be capable of supporting national policy for deterrence. The overall program is based on a comprehensive end-to-end assessment of the system. This program is balanced in the sense that provision of all the functional capabilities and reinforcements is essential to achieve the aforementioned capability. While alternative solutions exist to some of the problems we must solve, we believe these are: less likely to be cost-effective; of higher risk from the standpoint of meeting the military requirements; or both. Reductions in the strategic C^3 modernization programs should be avoided entirely; the risk is a dangerous delay in achieving needed strengthening of our strategic deterrent.

GLOBAL POSITIONING SATELLITE SYSTEM

Senator **WARNER**. Dr. DeLauer, as you know, this committee worked long and hard to insure that the Global Positioning Satellite System survived the congressional budget process last year. In part, we were able to do so because of strong indications of support for this program exhibited by senior administration officials such as yourself.

Do you continue to support this program and what steps are being taken by the Administration to commit money to back up its verbal expressions?

Dr. **DELAUER**. I am well aware and most appreciative of the Committee's effort in behalf of GPS in last year's budget process. GPS continues to have my personal support and the strong support of the Department of Defense. I believe our fiscal year

1983 request for GPS of $277M, which is an increase of nearly 40 percent over the amount appropriated by Congress in fiscal year 1982, is a prime indication of the Department's intent to support the program.

Senator Warner. What are you doing to comply—at a significant and appropriate level—with Congressional direction that reprogramming take place to keep the GPS program on track?

Dr. DeLauer. We are actively pursuing separate reprogramming efforts within the Department to initiate procurement of the operational spacecraft on a multiyear basis and to maintain essential Army participation in the development program. If the Congress approves this requests, we will keep the program on track and achieve the planned 1988 eighteen satellite constellation operational date.

MX MISSILE PROGRESS REPORT

Senator Warner. Would you give the Committee a progress report on the development of the MX missile? General Davis has described this as a "near-term option;" are we in fact at a point in the MX's development where we can feel confident that it is working and working well, and that it will be available on schedule, at cost in 1986?

Dr. DeLauer. The MX missile development program continues very much on schedule and without serious technical problems. The motors for all four stages have been successfully test fired. A recent example was Thiokol's Stage I success in December on the fourth motor firing of that stage. That test also included the first test of the flight thrust vector actuation system. The inertial guidance system has undergone extensive sled and centrifuge and static testing with success. The nosecone shroud that covers the reentry vehicles was successfully "flight" tested in December when its rocket motor lifted the shroud into the air and propelled it nearly 300 feet downrange. Then, in January, the first canister cold-launch test was conducted successfully with the full-scale, mass-simulated 195,000 pound "missile" being fired hundreds of feet into the air and downrange from the canister. The first of 20 R. & D. flight tests is less than a year away on a high-confidence schedule. We can say, indeed, that MX is working very well and that we have confidence that it will be available on schedule in 1986. We do not anticipate any future cost increases beyond normal adjustments for inflation.

ALTERNATIVES TO INTERIM MX

Senator Warner. Dr. DeLauer, have you looked carefully at the possible alternatives to the MX system that might be acquired at significant savings when compared with the projected outlays for interim deployment of MX—let alone longterm options? What would be the operational penalty—in terms of targeting flexibility and deterrent value—of simply retrofitting the Minuteman III force with the AIRS Guidance system and, to the degree that it has already not been done, with Mk-12A warheads, compared with a development of 100 MX missiles with ABRV warheads? What would be the difference in cost?

Dr. DeLauer. This Administration is thoroughly committed to the Triad concept of strategic forces. The President decided, therefore, that each leg of that Triad required modernization in order to assure survivability and endurance and adequate war-fighting capability of each of its components for the rest of this century. Since, in the case of ICBMs, that is not a job for a weapon system such as Minuteman III that was first deployed back in 1970, we chose to support the MX program. Having made that choice, that commitment to the substantial costs involved, and being protected by an in-being Triad, it made no sense for us to then start looking at interim alternatives to MX.

However, because of a recent Congressional inquiry, the Air Force has looked at the alternative you cite—adding the Advanced Inertial Reference Sphere (AIRS) to MM III and deploying more Mk-12A reentry vehicles. The first significant outcome is that the IOC would not be earlier than the MX IOC. Secondly, and given that three MM III would have to be improved for every MX, it would take about two and one-half years to achieve the equivalent MX capability that would be available within one year of IOC. That is because of the projected AIRS deployment rate limit of 50 per year. Thus, any deterrent value would be delayed relative to the MX deployment. The addition of AIRS adds weight that reduces both the range and targeting flexibility of MM III, already distinctly inferior to MX in the latter area. Some missiles would have to download one or two RVs to compensate for the increased weight, further reducing their targeting flexibility. Comparison of the targeting flexibility of the forces you defined would lead to a different conclusion. Assuming 600 MM III, the force would appear to have about 1,800 RVs. However, assuming 10 percent would download one RV and 5 percent, two RVs, the force would have about 1,440 RVs to compare with as many as 1,100 ABRVs. Thus, the MM III-AIRS force would appear to offer greater targeting flexibility due to the greater number of RVs. However, the greatly inferior footprint capability of the MM III-AIRS would almost certainly negate some of that advantage with respect to the set of real targets. It would in addition, lack some significant benefits offered by the MX approach. Going with MX requires an active production line for a modern ICBM, a clear deterrent to any Soviet plans for a "breakout" to gain a sudden, perhaps decisive, strategic advantage. In the important area of international perceptions, the MX deployment is a far more convincing statement of our intent to counter the threat both in the near and far term. The relative difficulty in maintaining the older system adds to the credibility of that statement.

A quick look at the costs shows that incorporation of AIRS into 600 MM III missiles, adding Mk-12A RVs to an additional 200 MM IIIs (total of 500), and re-starting the MM III production line to support the needed flight test program would cost about $13.5 billion in constant fiscal year 1982 dollars. The future cost for an operational force of 100 MX with ABRVs is $13.3 billion in constant fiscal year 1982 dollars. Basing this force in 100 Minuteman silos (not a DOD proposal) is estimated to cost $4.6 billion, bringing the total of the future costs to $17.9 billion. The difference in estimated cost for the two forces you defined is, therefore, $4.4 billion in constant fiscal year 1982 dollars, based on a very preliminary analysis.

ABRV

Senator **Warner**. Dr. DeLauer, I am sure that you have had an opportunity to read the article which appeared in this morning's Washington Post concerning the decisionmaking process and internal administration disagreements concerning the warhead selected for the MX missile. Now, as a veteran myself of some of those OSD-service scraps, I know that they can be bruising and that often a good deal of ill-will is generated in the process. Sometimes, articles such as these are a by-product of that proccess. Would you lay out for the committee precisely the considerations that motivated the Administration to select—over the Air Force's objection—the ABRV warhead rather than the Mark-12A?

Answer. The plain and simple fact is that we chose the ABRV because it is a better reentry vehicle for the job than the Mk-12A. The ABRV has a new fuze which actually improves the RV effectiveness so that the probability of killing a hard target with a [deleted] ABRV [deleted] is greater than that for a [deleted] Mk-12A [deleted]. Furthermore, the ABRV fuze has a significant anti-jam capability such that the RV effectiveness under jamming, is as good as it would be with an ordinary radar fuze without jamming. The ABRV warhead has been designed with modern safety features which preserve the option to use the system in mobile basing modes. Also, the warhead can be designed to provide a [deleted] than the Mk-12A's in the event [deleted] or MX should fail to achieve its accuracy goal as a result, for example, of being based in a mobile mode. One of the most important features of the ABRV is that it provides these benefits while using approximately [deleted] less than Mk-12A uses with the same [deleted].

The Mk-12A could be given two of the ABRV features, namely, the fuze and the improved safety warhead. The Air Force estimates that this would cost about $260M above the baseline Mk-12A program. The DoE is unable to provide a schedule for the [deleted] warhead until this warhead modification has been successfully tested [deleted]. Thus, selecting the Mk-12A with a new fuze and a modified warhead would add to the risk of missing the MX IOC.

As a final point, we wish to note that after allowing for the cost of upgrading the Mk-12A and the value of the [deleted], the additional cost for the ABRV is less than $200M, not the $1B reported in the Washington Post. For this cost we get a modern system while preserving the important option of going to a [deleted] and while [deleted]. (Of course, exercising the [deleted] option would sacrifice the [deleted] to obtain improved military effectiveness).

Concerning your comment about the Air Force's objections to the ABRV; the Air Force agrees with us that the ABRV has operational advantages. Our disagreement with the Air Force was over relative priorities in the program.

TRIDENT II ACCELERATION

Senator **Warner**. There has been a good deal of discussion about the Administration's desire to accelerate the Initial Operational Capability of the Trident II Missile System. We understand that the official IOC remains at 1989 but that directives have been issued encouraging the Navy to achieve a two or three year acceleration of the first availability for this missile. Are these reports correct? And if so, exactly what management or other steps do you envision the Navy taking to achieve this acceleration and at what costs in terms of procurement dollars being required sooner and/or performance degradation?

Dr. DeLauer. The official IOC is still [deleted] 1989. However, the Navy is examining the performance, cost and schedule risks plus economic feasibility associated with one and two year accelerations. We expect the Navy to complete the acceleration study later this month, after which we will assess all the factors before making any decision on pursuing an accelerated IOC. We intend to maintain the Trident II accuracy goal and achieve a system reliability the same as Trident I by using the same government-industry management team that produced the previous generations of successful SLBMs.

SURVIVABILITY/ENDURABILITY

Senator **Warner**. In your statement, you spend a great deal of time emphasizing the importance of achieving greater endurability and survivability in our strategic forces.

What precisely do you and the Administration mean by these terms? Do you envision—and are you programming for—steps to be taken that will permit important elements of our strategic forces such as the command and control system, the ICBM force and large elements of the bomber leg of the triad to survive indefinitely, or a matter of days, or simply the initial Soviet attack? To what degree can we identify in this budget specific programmatic actions and funding requests associated with improving the survivability and endurability of these forces beyond what is necessary to enable them to survive a first strike action?

Answer. The term "survivability" refers to the ability of our strategic systems to withstand a Soviet attack. The term "endurability" refers to the capability of our strategic systems which survive an attack to continue to function for as long as necessary (perhaps in a degraded mode) in a post attack environment. Systems which have high survivability but poor endurance are suitable only for spasmodic responses. They must be used quickly or they loose their operability. Systems which have high survivability and good endurance possess lasting utility and do not force the decision maker to rapid and perhaps, premature conclusions. In the case of our ICBM programs, we achieve "endurability" through the ability to operate these systems without dependence on outside power sources for a period of time following an attack. Minuteman silos presently have batteries of limited life and an unhardened diesel generator. Congress appropriated fiscal year 1982 procurement funds to add the Minuteman Extended Survivable Power (MESP) to the Minuteman III System. This MESP improves the endurance of that element of the force by adding batteries which extend the time that a surviving Minuteman missile can continue to operate after an attack without commercial power. Consequently, MESP improves/the "endurance" of that system.

The President's strategic program does provide the capability to extend the endurance of our command and control system and of the strategic weapons systems for as long as possible. This is necessary to permit the President or his successor to bring the conflict to a conclusion on terms favorable to the United States. Since we cannot predict the course of any war, we must be prepared to conduct a war lasting weeks or months, as well as a short war lasting only a few days.

Many of the new systems proposed improve survivability and endurance through their inherent characteristics. The MX program is primarily based upon these objectives. The B-1B with its inherent hardness (designed in) and its landing gear configuration permit its dispersal to many locations in times of crisis, thereby enhancing the survivability of the bomber force. These attributes also enhance its endurance since it can be recovered at locations which the Soviets would not/could not pre-target. Improved endurance of the forces can also be attained through changes in employment plans. Consequently, much of the costs are buried in the cost of these major programs. Those programs which can be identified which contribute to survivability/endurance in a major war in fiscal year 1983 are as follows. The list should be considered indicative not necessarily all inclusive.

B-1B.
MX.
ATB.
Major C^3 programs:
DSP upgrades and mobile ground terminals
Advanced warning systems
IONDS

Post attack reconnaissance
Mobile command center
MILSTAR
Ground wave emergency net
MEECN
SATCOM ground environment
PACCS E4B
NAVSTAR GPS
Crown helicopter upgrades
FBM control systems/TACAMO

ADPE PROGRESS REPORT

Senator **Warner**. Dr. DeLauer, you will recall that last year, with your assistance and that of the Department of Defense, this Committee pioneered legislative relief of the Department of Defense with regard to the procurement process for acquiring automatic data processing equipment associated with critical defense missions.

This committee remains vitally interested in improving the process for procuring these increasingly important components of major weapons systems and military support systems and it would be helpful to get from you a progress report regarding tangible actions that are being taken by the Department of Defense to implement this stream-lined acquisition process.

Are tangible steps being taken by the Department of Defense to reduce the time and procedures required by its own internal regulations to acquire ADPE?

Is further legislative action required?

Answer. On February 1, 1982, the Deputy Secretary of Defense designated me Senior Policy Official for all matters in the context of your initiative which is now included as Section 2315 of Title 10, United States Code. In that memorandum, Mr. Carlucci also issued interim DoD-wide criteria for acquiring ADPE and ADP services under 10 U.S.C. 2315.

This is the first time we have had the authority for the total system acquisition process in one place where the systems contain "computers" in the general sense.

On February 16, 1982, I, with Deputy Secretary Carlucci's approval, delegated this authority and responsibility to Mr. Mark Grove, who is currently my Director, Embedded Computer Resources. I directed that he form a high-level working group to review and revise the Interim Guidelines and set a suspense date of July 31, 1982 for completion of that action. I expect that the review will also identify details of the internal ADPE acquisition process and propose specific actions to simplify and streamline it.

Copies of those action memoranda are attached for the record.

As you know, the language of last year's Act left logistics equipment in the grey area. While certain portions of our logistics systems are not directly linked to the military mission, many of them include applications required to provide critical support, and a more explicit delineation is needed. In this regard, legislative clarification would be helpful. We can provide suggested clarification in the near future.

THE UNDER SECRETARY OF DEFENSE,
Washington, D.C., February 16, 1982.

Memorandum for the Deputy Secretary of Defense.

Subject: Delegation of authority, acquisition of automatic data processing (ADP) equipment and services—action memorandum.

Section 2315 of Title 10, United States Code (inserted by Section 908 of P.L. 97-86, The Department of Defense Authorization Act, 1982), contains language which excludes procurement of certain ADP equipment and services from the provisions of P.L. 98-306 (the Brooks Act). In your memorandum of February 1, 1982, you designated me to be the Senior Policy Official for all activities related to the acquisition and management of all Automatic Data Processing Equipment and Services in the context of Section 2315.

Subject to your approval, I hereby delegate those responsibilities to Mr. H. Mark Grove, currently Director, Embedded Computer Resources in the Office of the Deputy Under Secretary of Defense (Acquisition Management) as an additional duty. In this role, Mr. Grove will report directly to me as a Special Assistant.

I am also directing that Mr. Grove form a working group of senior military or civilian executives representing the military Departments, appropriate Defense Agencies and OSD Principals to develop revised DoD-wide criteria for acquiring

ADPE and ADP Services under the provisions of 10 U.S.C. 2315. This action should be completed by July 31, 1982. Further, I am asking that a consolidated plan for our continued responsibilities in this area be prepared to include necessary organizational considerations and necessary revisions to directives, instructions and regulations.

Respectfully,

RICHARD DELAUER.

THE DEPUTY SECRETARY OF DEFENSE,
Washington, D.C., February 1, 1982.

Memorandum for Secretaries of the Military Departments, Chairman of Joint Chiefs of Staff, Under Secretaries of Defense, Assistant Secretaries of Defense, General Counsel, Assistants to the Secretary of Defense, and Directors of Defense Agencies.

Subject: Acquisition of automatic data processing (ADP) equipment and services.

Section 2315 of Title 10, United States Code (inserted by Section 908 of P.L. 97-86, The Department of Defense Authorization Act, 1982), contains language which excludes procurement of certain ADP equipment and services from the provisions of P.L. 98-306 (the Brooks Act). Enclosure 1 contains the exact wording of that Section. Enclosure 2 constitutes more specific interim guidance on the "exempt" applications listed in Section 2315. Note that the essential test as to whether acquisition is covered by the Armed Forces Procurement Act or the Brooks Act is the functional usage of the equipment and services, and not their commercial market-place availability.

As pointed out in the OSD joint memorandum of September 14, 1981, exclusions provided to the Department by Section 2315 must be viewed as an incentive to seek improved and streamlined methods and practices. Interpretation of the provisions of the Act must not be lightly rationalized and used as an excuse to depart from sound business and management practices. I have given the Congress my pledge that, under either authority, maximum practicable competition will be sought and achieved. Moreover, appropriate life cycle management principles must also be pursued to achieve more effective and economical automated systems.

I am designating the Under Secretary of Defense, Research and Engineering, who has been named the Defense Acquisition Executive under DoD Directive 5000.1, to be the Senior Policy Official in the context of Section 2315. He may make necessary and appropriate delegations of this responsibility, subject to my review and approval.

My prior designation of the Assistant Secretary of Defense (Comptroller) as the Senior Policy Official for matters concerning the Paperwork Reduction Act of 1980 (P.L. 96-511), and the Brooks Act (P.L. 89-306), is not to be affected.

Where there is doubt as to the applicability of Section 2315, case-by-case determinations shall be made by the Under Secretary of Defense, Research and Engineering, in coordination with the Assistant Secretary of Defense (Comptroller). The guidance shown in Enclosure 2 will be reviewed and updated, as appropriate, as experience and new information are gained.

FRANK C. CARLUCCI.

Enclosures.

ENCLOSURE 1

PROCUREMENT OF AUTOMATIC DATA PROCESSING EQUIPMENT

Sec. 908. (a)(1) Chapter 137 of title 10, United States Code, is amended by adding at the end thereof the following new section:

"§ 2315. Law inapplicable to the procurement of automatic data processing equipment and services for certain defense purposes

"(a) Section 111 of the Federal Property and Administrative Services Act of 1949 (40 U.S.C. 795) is not applicable to the procurement by the Department of Defense of automatic data processing equipment or services if the function, operation, or use of the equipment or services—

"(1) involves intelligence activities;

"(2) involves cryptologic activities related to national security;

"(3) involves the command and control of military forces;

"(4) involves equipment that is an integral part of a weapon or weapons system; or

"(5) subject to subsection (b), is critical to the direct fulfillment of military or intelligence missions.

"(b) Subsection (a)(5) does not include procurement of automatic data processing equipment or services to be used for routine administrative and business applications (including payroll, finance, logistics, and personnel management applications).".

(2) The table of sections at the beginning of such chapter is amended by adding at the end thereof the following new item:

"2315. Law inapplicable to the procurement of automatic data processing equipment and services for certain defense purposes.".

(b) Section 2315 of title 10, United States Code, as added by subsection (a), does not apply to a contract made before the date of the enactment of this Act.

Interim DOD-Wide Criteria for Acquiring ADPE and ADP Services Under 10 USC 2315 (Armed Forces Proc Act) and 40 USC 759 (Sec. 111 of the Brooks Act)

A. EXCLUDED FROM BROOKS ACT

The following automatic data processing equipment (ADPE) and ADP services are excluded (exempt) from the provisions and implementation of the Brooks Act (40 USC 759) and are to be acquired in accordance with 10 USC 2315:

1. Intelligence Activities

ADPE and ADP services to be used by the DoD intelligence community for its intelligence functions and activities.

2. Cryptologic Activities Related to National Security

ADPE and ADP services to be used in cryptologic activities authorized by the National Security Agency.

3. Command and Control of Military Forces

ADPE and ADP services to be used in: DoD Component elements which are part of or in direct support of the WWMCCS (World-wide Military Command and Control System); and DoD Component command and control systems supporting deployable military forces.

ADPE and ADP services to be used in the National Military Command System and White House system.

4. Integral Part of a Weapon or Weapons Systems

ADPE to be physically located on, dedicated to, or essential in real time to the performance of the mission of a tactical, strategic, or space system. Includes ADP services for such ADPE.

ADPE and ADP services to be used for specialized training, diagnostic testing and maintenance, simulation, or calibration in direct support of one of more tactical, strategic, or space systems.

ENCLOSURE 2

ADPE and ADP services to be used principally for research and development of weapon, space, missile or intelligence systems at R&D sites, laboratories or test ranges.

5. Is Critical to the Direct Fulfillment of Military or Intelligence Missions

ADPE (and ADP services) that will deploy with commanders and forces to provide mission support in a combat environment.

ADPE and ADP services to be used in environmental systems supporting military missions, e.g., weather, oceanographic, satellite systems.

ADPE and ADP services to be used in: Legitimately security-classified military projects; warning, surveillance, and reconnaissance systems; mapping, charting, and geodesy systems; airlift, sealift, and port facilities systems; military communications systems, and other systems specifically designated by the Secretary of Defense.

B. NOT EXCLUDED FROM BROOKS ACT

1. Section 2315 of Title 10, United States Code, cities that the exclusions do not apply to "routine administrative and business applications (including payroll, finance, logistics, or personnel management)."

2. Unless specifically exempted under paragraph A. above, the following ADPE and services are not excluded from the provisions and implementation of the Brooks

Act (40 USC 759) and normally will continue to be procured in accordance with DoD implementation of Federal Procurement Regulation 1-4.11 and subject to applicable provisions of DoD Directive 5100.40: Military and civilian pay systems; Departmental, command, and base level financial management systems (budgeting, accounting, disbursing); Inventory/stock control, storage depot, and base level systems; Military and civilian personnel management systems; Medical management systems; Civil works systems; Office automation systems; and all other functions not specifically covered by paragraph A above.

3. Many user applications in direct support of operational missions are run on general purpose computers which may also support "routine administrative and business" applications. The categorization of a computer supporting multiple automated information systems is thereby complicated.

In most cases, the computer must assume the essentiality of the most mission-critical function being processed. The approach adopted in the management of these computers must focus on the categorization of the function to be satisfied.

However, a practice of assigning a small "excluded" application to a "non-excluded" computer to rationalize that the entire computer is, thus, "excluded" will not be acceptable and must be resisted by all command and management levels.

C. QUESTIONS OF APPLICABILITY

1. Interpretation of Section 2315 must not be used as an excuse to depart from sound business and management practices. Maximum practicable competition will be sought and achieved. Moreover, appropriate life cycle management principles must also be pursued to achieve effective and economical automated systems.

2. For ADPE acquisitions where there is some question of which Public Law applies, the DoD Components must seek a determination by the Under Secretary of Defense, Research and Engineering. These determinations will be made in coordination with the Assistant Secretary of Defense (Comptroller).

CONTINUED NEED FOR MX

Senator **WARNER**. You have described at length in your statement your view that President Reagan's strategic modernization program is a comprehensive and mutually-reinforcing package.

To what degree is that statement true of the MX missile system? Some have argued that plans to deploy the MX in non-hardened Minuteman silos, which does nothing to reduce their vulnerability to a Soviet attack, and plans being considered to accelerate the availability of the D-5 Trident II missile reduces the necessity for procuring the MX to the point where its cost is not justifiable. Do you agree?

Answer. No, we do not agree with that argument at all. We are thoroughly committed to the Triad concept of strategic forces, a concept entirely compatible with the mutually-reinforcing and comprehensive modernization program. The MX missile will be ready for land-based deployment in 1986. While the interim deployment in Minuteman silos will not have greater survivability than Minuteman, it will provide our earliest hard-target kill capability and inhibit Soviet adventurism around the world. The on-going production capability and operational experience with the MX missile will allow us to move quickly into permanent, survivable basing and eliminate any incentive for the Soviets to try to out-produce us in the missile field again. Prompt modernization of the land-based leg of the Triad is essential to maintain the mutually supporting features of our strategic forces which have allowed us to survive the problem of Minuteman vulnerability.

KC-135 REENGINING

Senator **WARNER**. Dr. DeLauer, I assume you have given careful study and consideration to the issue of the optimal means of extending the life and increasing the performance of the KC-135 Tanker Force.

The Congressional Budget Office contends that some $5.3 billion could be saved in budget authority over the next 5 years by reengining a portion of the fleet with JT-3D engines resulting in a reduction in performance during the 1980's of only 5 percent below the administration's option of reengining the entire fleet with CFM-56 turbo-fans. Would you comment in detail on your assessment of this alternative?

Dr. **DELAUER**. We have not received any version of the Congressional Budget Office recommendation; however, I would seriously take issue with their figures.

Over the long term, we plan to reengine most KC-135As with the CFM 56 engine. During the FYDP period (fiscal years 1983-87), we plan to buy reengining kits for 300 KC-135s, approximately one-half the total fleet.

We selected the CFM 56 over the JT3D because the CFM 56 reengining program is the most cost effective method of reducing our tanker shortfall. It enables us to use the full capability of the KC-135 airframe. It will add an equivalent of 308 KC-135As to the force if the entire fleet is retrofitted. By comparison, because of its lower performance and higher fuel consumption than the CFM 56, JT3D reengining of the full fleet would add only 123 KC-135A equivalents, assuming enough JT3Ds were available. Furthermore, the JT3D does not meet the 1985 EPA pollution standards. Though an improvement over the J57, the JT3D would still present noise and air pollution problems.

We do plan to reengine some special purpose C-135s with the JT3D as a very near term capability and as you are aware the Congress added funding in the fiscal year 1982 appropriation for JT3D retrofit of a limited number of KC-135s. This funding was not requested and I would much prefer to concentrate the program for production efficiencies on one alternative, the CFM-56. This is the long term option which will give us a modern KC-135 force capable of operations into the next century.

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

STRATEGIC BALANCE

Senator NUNN. In your written testimony, you state that the Reagan program for strategic force modernization will reverse the adverse trends in the U.S./Soviet Strategic Balance and reduce [deleted] the United States margin of inferiority that would have existed in 1990 under the previous program. What analysis is that statement based on and what calculations do you have to support that statement? What is the Military Damage Expectancy calculation for 1990 under the Reagan program as compared to the Carter program? What is it for 1989? What is the calculation for residual weapons for the Reagan program in 1990? What is it for the Carter program? What is it for both in 1989? When does the Reagan program bring the United States back to the 1977 levels of essential equivalence?

ANSWER. My statements regarding the adverse trends in the U.S./U.S.S.R. Strategic Balance were based on a number of analyses accomplished within the Department of Defense. At the request of the Committee, a paper presenting these analyses has been provided for the record. These analyses take into consideration the effect of recent changes in perception of the intelligence community regarding Soviet reload weapons and their capability to disperse their forces.

The question regarding Military Damage Expectancy (MDE) apparently refers to an analysis accomplished by the Strategic Air Command. The SAC analysis shows that the Reagan program provides a higher level of MDE than the previous program during the critical 1980's. Although neither program achieved the level of MDE that SAC claims existed in 1977 (assuming the attack occurs with U.S. forces at current levels of peacetime alert), the SAC analysis, consistent with all other analyses of strategic capabilities, shows that the Reagan program results in a very significant improvement in strategic force effectiveness in the mid-to-late 1980s compared with today's forces. Historical data can sometimes provide useful insights, but what's really important is where we are today and where we're heading in the future. With the Reagan program, our strategic capabilities will steadily and significantly increase throughout the 1980s.

BOMBER FORCE OPTIONS

Senator NUNN. Dr. DeLauer, last year during the debate on the strategic force modernization program, you used a comparison of what would be required to modernize the B-52 force as opposed to a B-1 option. Could you summarize exactly what the assumptions in that comparison were?

Dr. DELAUER. The assumptions were as follows:

(a) B-52 structural integrity would become doubtful after the year 2000 because of a 50 year old design and the associated uncertainties.

(b) Without the B-1B a large majority of the B-52s would remain in the inventory until 2000 or beyond due to the ATB deployment schedule considering technical risks.

(c) Operational and Support costs should be included in any comparison.

(d) The bomber force should be capable of the missions across the range of national strategic requirements. This includes nuclear weapons delivery in the penetration role, enduring survivability, cruise missile carriage and conventional operations as required by the Congress in the fiscal year 1981 Appropriations Act.

(e) Air refueling needs to support each bomber option.

(f) Reengining of the B-52 force to extend the life over an unprecedented 40 year operation.

(g) Considerable military risk if we were to extend the B-52 force beyond 2000.

(h) B-1B availability in 1986.

(i) ATB availability between [deleted] with a single ATB bomber program. The early date was realized to be very optimistic and high risk, but for comparison purposes was evaluated.

B-52 BOMBER ONLY OPTION

Senator NUNN. Did the B-52 option assume no ATB?

Dr. DELAUER. Yes, but this option also considered extending the FB-111A indefinitely. However, the ATB options assumed extending the B-52 until the ATB was available.

B-52 REQUIREMENTS

Senator NUNN. Has anyone ever indicated a hard requirement for some of the modifications you included, for example the re-engining of the B-52s. What about the requirement of EMP hardening? What accounts for the discrepancy in your figures and the ones that were submitted with the budget?

Dr. DELAUER. In comparing the options, B-52 only, B-1B only, ATB only and B-1B/ATB judgements were made on the necessary requirements for B-52 modifications. Some of the modifications were hard requirements and others, such as re-engining, were outyear judgements. For instance, given a B-52-only option or an option to extend the B-52 and wait on the ATB, re-engining becomes a serious necessity. In the mid-1990s, the B-52 engines, especially those on the B-52G, would be in excess of 40 years old, and considering that these were close to first generation jet engines, prudence would indicate replacement.

Given production lead times for new aircraft, whether B-1B or ATB, judgement is required regarding the extent of modifications necessary to keep the B-52 flying during the 1990s. This includes EMP hardening which is currently being evaluated for production costs.

In general we can expect that B-52 operations and support costs will continue to become increasingly expensive as the aircraft continue to age. Also, the modifications required during an additional 20 years of service life almost become speculative for an aircraft of 35-year-old design. Accordingly, our budget submission only included near-term requests and did not include the outyear analysis and judgements necessary for long-term planning. We are unaware of any discrepancy between the current budget request and the outyear bomber costs submitted to the Congress. Any data on alleged discrepancies will be appreciated, and data on all valid discrepancies will be furnished in detail.

[Whereupon, at 1:05 p.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

FRIDAY, FEBRUARY 26, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

TITAN MISSILE RETIREMENT

The subcommittee met in excutive session at 2:08 p.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Stennis, Exon, Levin, DeConcini, and Dole

Staff present: Frank J. Gaffney, professional staff member; Francis J. Sullivan, minority staff director; Paul C. Besozzi, minority counsel; Patrick L. Renehan, professional staff member; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon; Greg Pallas, assistant to Senator Exon; and Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. We will have a resumption of our subcommittee hearing with respect to your specific area, General. I understand you have opening comments with respect to both of these items. We will receive Dr. Wade for his opening statements and then we will go to questions by my colleagues here. Then we will go into some other matters. Is that agreeable?

Dr. WADE. Yes, sir.

Senator WARNER. Dr. Wade, if you will be so kind.

Dr. WADE. Thank you, Mr. Chairman. I would like to turn the floor over to General Davis, who has the first statement to make to the committee, and then I will make some observations thereafter if that is agreeable with you.

Senator WARNER. All right.

STATEMENT OF GEN. BENNIE DAVIS, USAF, COMMANDER IN CHIEF, STRATEGIC AIR COMMAND

General DAVIS. Thank you, Mr. Chairman, members of the committee. I welcome the opportunity as CINCSAC and the Director of the JSTPS to appear before you today to discuss the deactivation of the Titan II missile system.

As I had discussed with the committee in November 1981, my preference as an operational commander was to keep all the assets until new systems are deployed. But, as you are all well aware, the Air Force and the Congress face a very similar problem—that of allocating a limited amount of fiscal resources among many competing and urgent requirements. In response to these fiscal constraints, the Air Force reluctantly placed Titan II on the list of budget trade-offs and, although it was far down on the list it was accepted primarily because the savings that accrue in the outyears when modernization programs require large outlays that will certainly help. Between fiscal years 1982 and 1987, Titan II deactivation saves approximately $500 million.

A second factor—although certainly not a decisive one—in the decision was the age of the Titan II weapon system. Between August 1978 and September 1980, two major accidents caused Titan II missiles and their highly toxic propellants to receive very heavy media attention. Although missile age and condition had nothing to do with either accident, the media coverage centered on the age issue and the volatile propellants. Following these two incidents, I headed, for about a 5-month period, a group—I was not commander of SAC—so as an outsider I headed a group that looked into the safety of Titan for a period of about 5 months. That study found that the system was safe and supportable through the early 1990's. It was also concluded that despite the two accidents the Titan II safety record was better than that of comparable civilian industrial chemical operations.

To further improve Titan II safety and supportability, the Air Force began priority implementation of over 200 recommendations concerning safety and supportability following that accident. Of those 200, 150 of the recommendations have been implemented. Nonetheless, there remains a widespread concern as to the safety of Titan II.

Now, we have drafted a deactivation plan and it is expected to be in final form and ready for implementation in June of this year.

Senator WARNER. General, could you clarify the word "perception," is that a perception within the Department of Defense or a public perception?

General DAVIS. Public perception.

Senator WARNER. I think we ought to amend that.

General DAVIS. Very good, the public perception. There is no negative perception in the Department of Defense as to the safety.

We have the deactivation plan and, as was announced on February 9, deactivation will begin in October 1982 and extend over a 5-year period, with the final missile coming off alert in September 1987. Safety considerations in the handling down-loading, transport, storage, or disposal of the liquid propellants are the primary reason for the extended deactivation period.

Now, importantly, during this deactivation period, each missile will remain committed to SIOP alert until it is removed from alert. Under the present schedule, during the fiscal years 1983 through 1986 respectively, there will be [deleted].

This is to highlight the point that they do not phase out on one given date. It is over a 5-year period.

I would like to now discuss very briefly the SIOP impacts. As Director of the JSTPS it is my responsibility to develop a nuclear war plan which uses existing forces that serve as a credible deterrent. The following is a summary of recent Titan II target coverage.

Senator **Warner**. General, to interrupt a minute, this is classified "Secret." Most SIOP is higher, but I presume you have verified this is no higher than secret, that part.

General **Davis**. That part; yes, sir.

Titan II is SAC's only multi-megaton, prompt response weapons system. Its large yield makes it extremely effective against very large, soft area targets in spite of its large circular error. But [deleted].

It is because we regard this contribution as significant that we plan to keep Titan II's on alert over the 5-year period until the actual day that the schedule calls for removal. During the extended phaseout, loss of Tital II's contribution to the SIOP will be offset by our planned strategic force modernization program.

We expect to replace 50 Minuteman II's with 50 Minuteman III's by 1984. By late 1986, we anticipate the first full flight of [deleted] MX to be operational in addition to over [deleted] air-launched cruise missile weapons. At that point there will still be [deleted] Titan II's on alert.

When all factors are considered, deactivation of Titan II's, Minuteman modification, MX and air-launch cruise missile deployment, we expect to realize a net gain of about [deleted] warheads in the ICBM and bomber forces.

Moreover, the gained warheads will be much more compatible with our current national policy guidance and strategy. Titan II has become an example of that strategy-force mismatch. It was fielded under a strategy of assured destruction. Its large yield supported [deleted].

Senator **Warner**. General, just before you turn the page I had another clarification up there in the top paragraph, [deleted].

General **Davis**. Yes.

Senator **Warner**. Could you clarify whether one missile is used for a combination of targets, or one missile can alternate between them?

General **Davis**. I was going to get to the point. I am going to show the briefing that was shown to Senator Exon at Omaha in December, and it points that out. It is a series of targets within an overall target.

Senator **Warner**. I understand that, but I want the record to reflect it. So, it will be in the briefing.

General **Davis**. That is correct.

It should be noted that civilian fatality statistics were a minor consideration under the old mutual assured destruction policy, which is not necessarily the case today.

Now, in contrast to the strategy of the 1960's and early 1970's, today we must provide flexible targeting options which destroy both hard and soft targets, yet keep civilian fatalities at the lowest possible level.

Our current strategy calls for a counter force attack against military targets which are best attacked by a smaller yield, more highly accurate weapon. [Deleted.]

In summary, Titan II deactivation will be compensated for through planned strategic force modernization. A recent JSTPS analysis portrays the Titan II SIOP damage contribution. Now, this analysis will be presented by Major Van Tiem who is with me on my far right as a follow-on to the SAC briefing on Titan II presented this past December to Senator Exon at SAC Headquarters.

The briefing given to Senator Exon was a briefing that was prepared back in October 1980 at the request of the Secretary of the Air Force, after the Damascus accident, to see what the impact would be if you phased out all 52 Titans. So, we looked at the Titan II's in isolation, and assumed that you would pull them all out—there was no interaction. That is the briefing that I would like to show at this time and, then, present some additional analysis in conjunction with it.

So, if there are no objections, or would Dr. Wade like to make comments before we present the briefing?

Senator WARNER. Dr. Wade.

STATEMENT OF JAMES P. WADE, PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Dr. WADE. Thank you, Mr. Chairman.

While I do not have a prepared statement, I would like to make several observations from the OSD perspective, first noting that General Davis' statement covered the important points very, very well.

In structuring our comprehensive strategic modernization program, the Secretary of Defense recommended, and the President approved, the phased retirement of Titan quite simply because they believed that under a constrained budget Titan no longer contributed enough to deterrence to justify its cost.

Now, to explain this position I would like to make the following points. As General Davis has noted, Titan is an area weapon, and it does not have the accuracy to significantly help influence Soviet behavior in a crisis. While the safety and the security of Titan are considered acceptable, our goal is to improve the safety of all our nuclear weapons, and we thus need to phase out older systems designed to less demanding standards.

The Congress has, of course, been most supportive of this approach and has, for example, encouraged us to use insensitive high explosives on our new ICBM warheads.

Next, the avoidance of hundreds of millions of dollars over the next 5 years, and the freeing of large numbers of scarce military technicians are welcome contributions as we seek to modernize our forces in the most cost-effective manner possible.

Finally, the notion that, from the military standpoint, Titan could be retired is not new. I recall that as early as 1974 there was general approval within DOD for phasing Titans out of the inventory. Such a step was not taken, largely due to arms control negotiating considerations.

Titan II has been growing less and less relevant to our nuclear strategy over the past several years. It has been retained in part to convey the impression that we had maintained parity under arms control agreements.

This administration is no longer content with such simple static measures as equivalent megatonnage to describe the balance of forces with the Soviet Union, and thus no longer feels driven to maintain an obsolescent system for appearance's sake alone.

The phased retirement of Titan, therefore, is consistent with the President's stress on modernization, endurance, and effectiveness of our strategic forces in the most economical manner possible. Thank you.

STRATEGIC STRENGTH

Senator **WARNER**. Dr. Wade and General, during my recent trip to the laboratories there was stress put on the fact that this Nation is presently striving in its upgrade program—both as it relates to safety enhancement and the development and introduction of new weapons systems—to maintain a relatively stable number of warheads. In other words, we are not increasing overall the number of warheads, was my understanding based on these briefings. That was a composite of the whole strategic force.

Now, on page 3 the statement is made, in the last sentence, the middle paragraph, "Deactivation of Titan II's, Minuteman modification, MX and ALCM deployment, we expect to realize a net gain of about [deleted] warheads."

Can you reconcile that statement with the briefing material that I received?

General **DAVIS**. I have not seen those briefings. We are replacing large area weapons like Titan which carries a [deleted] with smaller, more accurate, and, if you will, surgical weapon systems. I am not sure of the exact numbers, but perhaps Dr. Wade remembers the final count of the nuclear weapons modernization program. What we are doing is taking older, assured-destruction type of weapons and replacing them with smaller, more accurate, modern, and safe weapons.

Now, the final count I am not sure I have.

Senator **WARNER**. Dr. Wade.

Dr. **WADE**. Mr. Chairman, if you look at the total stockpile in the sense of aggregate numbers, the numbers over the past few years have gone down. You will also see over the next 5 years that there will be an increase in the total number of nuclear warheads deployed, both strategic and tactical, on the order of several thousand.

The point the laboratories are making is that we have many weapons deployed that are old in the sense of the safety standards that were in force in the 1950's. We need to turn the older weapons over, I think, as quickly as we can, while also facing up to the need for placing these newer weapons in the force at the same time.

Senator **Warner**. Mr. Secretary, I am with you and very supportive. As I said the other day, I even suggested a plan whereby for certain categories of weapons we modernize 10 or 20 percent as quickly as possible to provide adequate numbers of safe modern weapons for alert purposes.

But Mr. Gaffney, am I not correct, in those briefings they stressed time and time again the flat curve, even in the outyears? We are going to have to get this correctly.

General **Davis**. We are going to have to resolve it because as ALCM's come on, our warheads——

Senator **Warner**. Your statement is clear. I just brought up on what we were briefed on elsewhere.

General **Davis**. Yes, sir.

Senator **Warner**. We will get this.

General **Davis**. Might I, Mr. Chairman, get Major Van Tiem's briefing? I promised the committee I would get the briefing to it.

Senator **Warner**. No question about it, we will go to that. I want to defer to my colleague here. Chairman Stennis, do you have any comments?

Senator **Stennis**. No, Mr. Chairman, thank you very much.

Senator **Warner**. All right, we will go to the briefing.

STATEMENT BY MAJOR GEORGE VAN TIEM

Major **Van Tiem**. Mr. Chairman, members of the committee, as General Davis stated, this briefing was originally prepared in 1980 and presented to the Secretary of the Air Force. It was subsequently presented to Senator Exon in December 1981.

Agenda

Titan II characteristics.
Representative Titan II sortie.
Titan II contribution to the SIOP.
Conclusions.

I would like to review the impact of the weapons system to date, and this is the agenda we will be addressing. We will first look at a couple of characteristics of the Titan II weapons system. Going from there, we will go to the representative Titan. I think this will answer your question, sir, on the number of DGZ's that the Titan will cover.

We will then look at the total contribution made by the Titan II weapons system to the SIOP, finally present several conclusions.

TITAN II CHARACTERISTICS

Two of the first characteristics I would like to address are the range and the yield of the weapons system itself. The range is [deleted].

The [deleted].

Senator **Warner**. What is the [deleted].

Major **Van Tiem**. There are some aircraft weapons, sir, in the [deleted] range.

MISSILE COMPARISON

To show you where Titan II fits in comparison with the other U.S. ICBM systems, we have on this slide four systems, the Titan II and the Minuteman II are the only single-headed weapons systems that we have, Minuteman III——

Major ANDERSON. Excuse me, Mr. Chairman, I am Major Anderson from the Air Force. I would like to stop for just a moment to verify that everyone here does have an appropriate clearance.

Senator WARNER. Thank you for doing that.

Major ANDERSON. I can vouch for the people with the Air Force.

Senator WARNER. Thank you, Major.

Major VAN TIEM. We have the Minuteman III Mark 12 and the new Mark 12A which are three-warhead systems with the kiloton yields and CEP's as indicated on the slide.

You will notice for the Titan II the utility of the [deleted]. It allows us to cover many targets or DGZ's of a soft nature, freeing up the more accurate systems for counterforce targeting.

Senator WARNER. What would happen if a Titan II landed in the middle of Manhattan?

General DAVIS. In terms of results?

Senator WARNER. Yes.

General DAVIS. All of those are relatively soft-type structures.

Senator WARNER. What would be the breadth of destruction?

General DAVIS. Do you have a slide example?

Major VAN TIEM. There are two slide examples.

[Slide deleted.]

Senator WARNER. All right, fine, if you have that analyzed.

Major VAN TIEM. Sir, one question is always raised is the megatonnage comparison in the ICBM inventory, and this is one example for one comparison of numbers. The 52 Titans, in fact, account for [deleted]. The next slide, please. [Slide deleted.]

Turning, sir, to an example of a Titan DGZ today. This slide shows one Titan aim point at the red cross hatch, and the small numbers represent the answer, I believe, to your question on what would happen if a Titan would go off in New York.

[Deleted.] The damage of the weapon would reach out to those extremes. [Slide deleted.]

[Deleted.]

Having seen the way we use Titan today in the SIOP, this slide shows the contribution of the 52 Titans to SIOP Five Foxtrot.

There are [deleted]. Those [deleted] installations.

The total [deleted]. Titan weapons system, is 72 percent of the Soviet [deleted]. If Titans were excluded, just the 52 Titans were excluded, the damage would drop down to [deleted].

Due to the high alert rate of the ICBM force, the Titan large-yield warhead accounts for approximately [deleted] of all the alert megatonnage in silos. Additionally, it also accounts for approximately [deleted].

CONCLUSION

Titan II remains a key U.S. strategic weapon system: Contribution to SIOP; Soviet perceptions; and current strategic balance.

In conclusion then, sir, I would say that although the Titan is an old weapons system, it does make a positive contribution to the SIOP today by covering [deleted].

I would also say that possibly the Soviet perception of a [deleted] may in fact be a deterrent. We know historically that they have put a lot of faith in large-yield weapons, as has been indicated by their weapons systems of the past.

Last, our force modernization program, when coupled with the drawn-out deactivation of the Titan, make a very positive contribution to the strategic balance that we have today.

TITAN II SIOP ANALYSIS

This concludes the portion of the briefing on Titan that was done in isolation. I now have two analyses that I would like to go over with you. One was conducted to quantify the effect on the SIOP if all 52 Titans were removed simultaneously. Although we do not plan on doing that, we wanted to quantify these effects. The next slide, please.

[Slide deleted.]

This slide shows the result of this analysis. I would like to go across the first line of data just to review it with you, and then I will show you all of the data.

We are addressing the nuclear threat target information with this particular line of data, and there are in fact [deleted] installations of this type in the national target base. If we include the Titans in the alert coverage plan, the day-to-day plan, we cover [deleted] and achieve a damage expectancy of [deleted].

If the Titans are removed, that is all 52 Titans are removed simultaneously, the coverage drops down to [deleted]. So, we lose coverage on some installations but for this particular target category there is no corresponding drop in damage expectancy with the removal of Titan.

The same headings apply in the generated case and again, over here we have [deleted].

Alert case is your normal day-to-day alert force without any strategic warning. If we have strategic warning, then we go to the generated posture as nonalert assets are generated to alert status.

This is the total results of the analysis that was accomplished, and the bottom line is that we currently achieve a damage expectancy of [deleted] percent in the alert plan with the Titan included. Removal of those Titans results in [deleted].

Over in the generated case, we currently achieve in the generated case.

Again, this would occur only if you take out all 52 Titans simultaneously.

[Slide deleted.]

The next analysis tries to break it out in a more phased approach, that is, the actual phaseout rate of the Titan II. We have spaced out the 52 Titan deactivations over the next 5 years and an excursion was conducted to attempt to identify the number of smaller weapons that would be required [deleted] as the Titans are deactivated.

For the purpose of this particular excursion, the ALCM—the air-launched cruise missile—was the weapon that was selected for the analysis.

We were able to determine that for the first year when [deleted] Titans are being deactivated, if you wanted to maintain the same damage levels that were achieved with the [deleted] Titan in the SIOP, it would take [deleted]. The chart steps on across to the second year of the deactivation program when [deleted] Titans have been deactivated; here it would take [deleted]. In 1987, to replace all 52 Titans we believe it will take approximately [deleted]. The next slide, please [slide deleted].

The blue numbers above the green ALCM numbers are in fact the number of ALCM, in addition to the ones required to offset the Titan damage, that will be deployed during the individual years. So, in addition to the [deleted] we will have an additional [deleted] in fiscal year 1983.

Senator EXON. Mr. Chairman, could I interrupt for a question here?

Senator WARNER. Certainly.

Senator EXON. Major, was this chart, the one that you have now, shown while I was at SAC for the briefing?

Major VAN TIEM. No, sir.

Senator EXON. Well, let's just clarify this. I understood and you started out that the briefing we were going to get was exactly the same one that I got when I was at SAC. Is that true or not?

General DAVIS. That is true, and that is what he showed you. Then he said there was analysis following. We are trying to clarify the point, Senator. That is exactly what he said.

Senator WARNER. Senator Exon, I thought I understood him to say that that was the briefing presented, now we go on to another briefing that has been prepared. I believe the record will reflect that. I am happy to go back.

Senator EXON. All right. I thought when you started out, Major, you said that the briefing you were going to present was the same as I had at SAC.

Senator WARNER. He did say that?

Senator EXON. He did say that.

Senator WARNER. Yes.

Senator EXON. But now this is additional and new information, supposedly to justify the taking out of the Titan; is that correct?

Senator WARNER. Supportive of the case.

Senator EXON. I thank the Chairman.

Senator WARNER. When he started he said, "This is the briefing you have received in a certain timeframe."

Senator EXON. This is more and beyond that. I missed that part.

Senator WARNER. What he should have said, we have a two-part briefing, A-part is what you saw in 1980, and B-part is what we just prepared and supportive of the President's program, would be my guess. We are into B now.

Senator EXON. Was this chart available when I was at SAC the last time?

General DAVIS. No, sir, it was not.

Senator EXON. This is new since that time.

General DAVIS. It is new since that time.

Senator **Exon**. Thank you.

Senator **DeConcini**. Mr. Chairman.

Senator **Warner**. Yes.

Senator **DeConcini**. Major, the blue line and blue figures are increased systems. What systems are they representing?

Major **Van Tiem**. They are strictly ALCM's, sir. That was the only weapons system that was addressed.

Senator **DeConcini**. Strictly what?

General **Davis**. Air-launched cruise missiles.

Senator **DeConcini**. Thank you.

Major **Van Tiem**. I would like to clarify that this is not to imply that we would target the air-launched cruise missile the same way that we target the Titan today. These two systems are not very compatible as far as targets that they are designed to attack. But for the purposes of this excursion we simply wanted to try to identify the number of weapons that would be required to maintain the particular damage expectancy level.

In fact, as each Titan is deactivated we will be [deleted].

Senator **DeConcini**. Do you anticipate any problems in making these changes as scheduled?

General **Davis**. No, sir, ALCM is coming along fine.

Dr. **Wade**. The initial operating date for the ALCM is December of this year, 1982.

Senator **DeConcini**. And you anticipate that that will be achieved?

General **Davis**. Yes, sir, that is the end of your briefing. I would like to clarify one point, Senator Exon. I was not, unfortunately, in the headquarters when the briefing was presented to you.

The natural inclination in the old briefing was to show the impact if you take all Titans out. The point is, you obviously have other things coming in. In addition to ALCM there are Minuteman III's coming in, and, of course, by the date the last Titan phases out we should have 10 MX's in Minuteman silos.

Now, another question asked of me by this committee—and if you would indulge me, Mr. Chairman—is the question of Titan II's and B–52D's. I have an additional very simple chart that shows you the impact of Titan II's and B–52D's with what is coming in.

Major **Van Tiem**. Sir, this slide reflects the draw-down of the B–52D's and Titans and force modernization.

General **Davis**. The blue line is the number of warheads in 1982 with the loss of warheads from SIOP alert as a result of Titans and B–52D's phasing out. The orange line shows the impact of the programs I just enumerated, air-launched cruise missiles, Minuteman III's, B–1's and MX's.

Senator **Exon**. Do you have a chart on the megatonnage?

General **Davis**. I do not have a chart on megatonnage. As I tried to point out in my opening statement, and as Dr. Wade said, today, we have principally a bag of nuclear weapons that were procured for a different strategy, the strategy of mutual assured destruction—large weapons with not very good accuracies.

With our current strategy we need to buy weapons that are smaller and more accurate, that is, more surgical-type weapons. Megatonnage match was a good measure in the early days. We can give you for the record the total megatonnage, but the comparison should also examine the weapon systems capability against specific military targets and particularly the harder targets.

Senator EXON. Well, just let me say, General, I appreciate that all these things are relative. We have said something earlier about the perception of the American public with regard to safety of the Titans, and that might not necessarily agree with what the experts such as yourself feel.

You know, public perception does play a role because I think we all remember during the attack against the approval by the U.S. Senate of the SALT agreement that we were besieged—literally besieged—with megatonnage. I also think I would not stand to be corrected if I said the last Presidential election was based primarily on the "window of vulnerability" that addressed itself primarily to megatonnage.

General DAVIS. I would differ with you, it did not address itself primarily to megatonnage. It addressed itself to war-fighting capability, that is what it addressed itself to. And the window which the committee has been careful to instruct me and point out to me, was based on military damage expectancy—not megatonnage but war-fighting capability, Senator.

Senator EXON. If we could follow up on this.

General DAVIS. Certainly.

Senator EXON. Was not war-fighting capability also deteriorated by the decision of the administration to do away with the MPS basing mode for the MX? Does that have any effect on our strategic planning?

General DAVIS. The B-1 has an effect, the MX has an effect. The MX will give us a prompt, hard target kill capability and the advent of MX and survivable basing will bring us back to some sort of reasonable parity, all having to do with war fighting.

Senator EXON. Obviously, though, since we have sat back the deployment in the MPS basing mode with the MX, that has been delayed; has it not?

General DAVIS. Yes, sir.

Senator EXON. Thank you.

Senator DECONCINI. Mr. Chairman, if I could ask a question?

Our national strategic policy is no longer mutually assured destruction, do I gather that?

General DAVIS. Yes, sir.

Senator DECONCINI. When did that change?

General DAVIS. I would say at least 2 years ago, and with the advent of PD-59 and the [deleted].

Senator DECONCINI. And what is it referred to as now? What is our strategic policy called now, in place of mutually assured destruction?

General DAVIS. Counterforce.

Senator DECONCINI. Counterforce. That is not classified, is it?

General DAVIS. No, sir, or "war fighting," the two are synonymous.

Senator WARNER. Do you not want to work "flexible" in there, to polish up the answer?

Dr. WADE. Mr. Chairman, we really have not come out with a new "buzz" word in that sense. Basically it is a straightforward approach toward increasing deterrence through total force modernization. I think some of these "buzz" words do confuse people. We are not aiming at destroying Soviet cities per se for deterrence. The question is improving our war-fighting capability in order to prevent him from believing that he can go to war first and defeat the United States.

Senator **Warner**. Wait a minute, you dropped your voice. In order for him—let us get that sentence.

Dr. **Wade**. In order for him to perceive a deployed posture that we have in our military forces that will prevent him from ever making that decision to go to war.

Senator **Warner**. I read it here in the testimony and I want to make sure what you are saying is parallel to the testimony. Senator DeConcini raises a valid point and I want to make sure this record is clear. Where is it in the testimony? Somebody knows it by heart here, that describes this change in policy.

General **Davis**. Page 4, the second paragraph, about the third sentence in, "Our current strategy calls for counter force attack against military targets which are best attacked by smaller yield——

Senator **Warner**. There is the point, Senator DeConcini, "In contrast to this strategy of the 1960's and 1970's, today we must provide flexible targeting options."

Senator **DeConcini**. I thank the chairman.

U.S. FORCE MODERNIZATION

Senator **Warner**. Now on that chart—just a minute, please—U.S. force modernization, does that include submarines? When you use the words "U.S. force" I think of totality.

General **Davis**. I am sorry, Senator.

Senator **Warner**. When I see a chart that says "U.S. force modernization" the question is: Does that include all three legs of the Triad?

General **Davis**. Yes, sir.

Dr. **Wade**. Mr. Chairman, may I add to the rationale behind Titan retirement?

The key focus and the primary emphasis on how we put the force package together was the achievement of enduring survivability. Enduring survivability in all five elements—namely, command, control, and communications systems, and similar endurance in the forces themselves—whether it is the ICBM force, the bomber force, the SLBM force, and the air defense force.

I would like to note here that today the Soviets are deploying in their latest mods to their SS-18 and their SS-19 accuracies that are [deleted] our current Minuteman III force.

Note that with the Titan force the launchers are softer than current Minuteman launchers by almost a [deleted]. Therefore, what would survive a Soviet first strike, what would remain for retaliation is the relevant question. This force, although usable, fell below the resources available in modernizing our weapons systems.

In the sense of what General Davis has mentioned here, we have the new ALCM weapons coming in December of 1982. We see the new B-83 strategic bomb soon to deploy into the bomber force, both initially for the B-52 and then the B-1B. We see now additional

Mark 12-A's coming into the Minuteman force. We see C-4's deploying into the Trident force. Over time you will see increased capability in that one key characteristic, and that is enduring survivability.

So, with the Titan, we are talking about an old system that does not have endurance. It is a useful system, but in the context of priorities it was dropped out.

General **Davis**. I think it is instructive also to note that the Soviets had almost a parallel system, the SS-9 came in the inventory about the same time, about 1965. The Soviets, on the other hand [deleted] as Dr. Wade says, than we have today. That is part of the threat.

That whole force generation, SS-17's, SS-18's, and SS-19's are in [deleted]. That is why we need MX as a prompt hard target killer. Some aircraft weapons are also hard target killers, but they are not prompt.

The very fact that we produce MX which has all of the advantages of ICBM's—that is, high alert rates, excellent response times, reliabilities and accuracy—and carries 10 RV is the only thing in terms of the ICBM that will put the Soviet hard targets at risk—it deters.

In accordance with our policy, the knee of the accuracy curve is about [deleted] and MX puts those fourth-generation missiles at risk.

Now, we can debate delaying the decision until we come up with a survivable basing mode, but that is akin to the same debate we have been on for the last 12 years where we were waiting for better technology to build a bomber—and we have not built a new one since 1962—waiting for better technology and the ideal basing system before we decide to deploy an advanced ICBM. The Soviets did not worry about that at all.

It is the threat that drives this. I realize dollars are akin to threat. Analysis—people are fascinated by analysis. When our military judgment is not accepted, then we resort to analysis. I do not mind analysis. And, then, you want to put one analysis against the other.

We do our jobs and wear this uniform because we love this country, and we are trying to give you the best of our judgment.

Senator **Exon**. Mr. Chairman, could I ask that we put the chart back up, the blue chart?

Senator **Warner**. Certainly.

General **Davis**. Sir, the last chart?

Senator **Exon**. ALCM.

General **Davis**. The next to the last chart.

Senator **Exon**. The next to the last chart. Can we put that back up?

Mr. Chairman, let me say in response to the general's statement so that there is no misunderstanding. We all love this country very much, I think. And I think that your remarks did not mean to imply that you love it more than we.

General **Davis**. Not at all.

Senator **Exon**. We share the same concerns that you do, and that is one of the key reasons. I have learned since I have been here—for 3 years now—I have a different perception of the Soviet threat.

Let me ask this question: In that light and in the context, how much better off would we be as far as persuading the Soviets from launching a first-strike attack if we did, General, what you are suggesting there, while keeping the Titans at the same time? Would we not therefore be that much better off at a cost of only $100 million over a 5-year period, or something like that?

General DAVIS. $500 million.

Senator EXON. $500 million, $100 million a year for 5 years, $500 million.

General DAVIS. Obviously, the more you keep, the better off you are in total inventory. But if you must also consider the effectiveness of what you keep, particularly if the country is trying to finance a modernization program which is where we ultimately want to go. "More" is better in terms of perceptions, but the greatest perception in terms of deterrence is the fielding of an accurate ICBM that puts his hard targets at risk.

Senator DECONCINI. Would the Senator yield for a followup question?

Senator EXON. I would be happy to.

Senator DECONCINI. Isn't what the Senator from Nebraska actually saying is that you should go ahead and move forward with the new generation of weapons that puts the Soviets' hard targets at risk, but that you should also keep the Titan II's which can keep his soft targets at risk. Thus you maximize your ability to keep two things at risk now.

What you are suggesting is that it is better to have the hard targets at risk which are not at risk now, and in exchange for that, drop the system that currently targets the soft targets.

I think the Senator raised a good point: Why not have both at the cost of $500 million? Is there a reason other than the cost? Because when we are talking about increasing defense expenditures, the amount we are talking about is relatively small. Is it for technological reasons or some other reason besides the $500 million that persuades you not to do this?

General DAVIS. Sir, let me back up to the beginning. As a field commander I would like all the assets I can get until we get new things to take their place. What I said was, the Air Force reluctantly put Titan II's on the list for cuts last year when there were budgetary pressures. They were accepted to be phased out in the name of modernization, if you will, to help finance modernization because there were the same concerns last year as there are the same deep concerns this year.

I am merely trying to explain to you, Senator, that for those who say, "You are opening wider the window of vulnerability," my answer to that is, "No, there are replacement systems coming in."

Senator DECONCINI. Your answer to me is that, sure, if you can have everything you want, you would keep the Titan II's.

General DAVIS. That is right.

Senator DECONCINI. But because of the development and deployment of new systems the new generations, we are able to look to the future rather than to the past.

General DAVIS. Exactly right.

Dr. WADE. May I add to that, sir?

Senator DECONCINI. Please.

Dr. **Wade**. There was also the fact that I belive everybody here felt it was of vital importance to really move out and fix our command, control, and communications. If you look at our budget, both in 1982 and 1983, and in the outyears, in the C^3 area, we have added sizable amounts of money [deleted], $500 million does give us a very helpful start in improving C^3. That is really the kind of trade-off that we are talking about.

Senator **Exon**. Yes, there are trades.

Thank you, Senator De Concini, you were very helpful in your question, it was getting what I was going at. Let me phrase the question this way: If this committee could persuade its majority, and if we could persuade the administration, and if we could persuade our colleagues on both sides of the Hiil to come up with another $500 million over and above that which is recommended in the Air Force budget, would you think it would be a good idea to keep these Titans longer than starting the phaseout in October?

General **Davis**. And not at the expense of connectivity, the MX, the B-1, or any of these programs?

Senator **Exon**. Yes.

General **Davis**. This is plus, over and above?

Senator **Exon**. Yes.

General **Davis**. Certainly.

Senator **Exon**. Would you think it might be a good idea—General, this is not your responsibility, but it is ours. I see in the budget that there has been a request for $475 million for next year to bring one old World War II battleship back. You do not have any battleships so I expect you would be willing to give some of those up.

It seems to me if we are talking priorities as far as trying to deter the Soviets that the $500 million, the $100 million a year and a $216 billion budget just pales by comparison. I do not think it is a very salable way that we can tell our colleagues that this should be eliminated because we are going to save $100 million a year.

What would you think, if I gave you the option—regardless of what uniform you are wearing—if you are sitting over here representing all Americans and all the services if I said to you, "I think maybe it would be a good idea if we would not bring that one battleship up from mothballs and keep the Titan." Do you think that would be a good trade-off for America?

General **Davis**. Senator, I would have to know the use of the battleship.

Senator **Exon**. Well, there is only one of them.

General **Davis**. What are we going to use it for? Is it going to carry cruise missiles? To answer your question I must know what it is going to do.

Senator **Exon**. Envision in your mind, General, that you could use that for anything that you wanted to. How valuable is one battleship, regardless of how it is used, compared with giving up 52 Titans with [deleted] of the total megatonnage that we have in our ICBM forces?

I do not know, I am not an expert. I assume they are going to use it for, among other things, missile launchers. But assume anything you could imagine, you are a military expert and I am not, anything you could imagine that they would use that one battleship for, and tell me if you think it is in the interest of this country to bring that battleship out—whatever it is used for—as opposed to starting to knock out these 52 Titans.

General DAVIS. Before I could answer that with any authority I would have to know what it was used for, Senator.

Leave that aside. If the Congress in its wisdom would add $500 million to $216 billion, certainly as a field commander I would like to have those weapons stay on until we can replace them with a new ICBM.

Senator DECONCINI. Would the Senator from Nebraska yield for a moment?

Senator EXON. I am finished, go ahead.

Senator DECONCINI. Just to follow that up, what if Congress gave you $500 million and said, do whatever you want with it in addition to everything you have already requested. If you could put it any place you wanted to, General, would you put it with the Titans and keep the Titans, or would you expand your plans for the new generation?

General DAVIS. I would have to see what that $500 million would do for us in terms of solving other problems such as funding a survivable basing for MX or bringing the missile on sooner, or helping to reduce the size of the overall Defense budget.

Senator DECONCINI. Thank you.

Mr. Chairman, may I ask one other question, and then I have to leave.

Senator WARNER. Senator DeConcini, ask questions as long as you want.

Senator DECONCINI. Does the Air Force have any short-range or long-term plans for the Titan silos other than that they are going to be put into caretaker status for the time being?

General DAVIS. They are going to be put in caretaker status for the time being. The silos?

Senator DECONCINI. The silos.

General DAVIS. The missile boosters will be utilized in the space program.

The silos will be put in caretaker status.

Senator DECONCINI. And there are currently no plans to deploy any other missile in those silos.

General DAVIS. At least at this point.

Senator DECONCINI. Thank you.

Mr. Chairman, I thank you very much for including me in these hearings.

Senator WARNER. As long as you mentioned boosters, you might mention the warheads, there is some salvage value there, too.

General DAVIS. Yes, sir.

Senator WARNER. There is very important salvage value.

Now, have you gentlemen both had the opportunity you want? Senator DeConcini, are you going to join us again at 3:30?

Senator DECONCINI. No, I need to chair some hearings for Senator Cohen.

SenatorWARNER. Thank you for joining us.

Senator EXON. Mr. Chairman, are we about to wind down this session? I have a few more questions.

Senator **Warner**. You can take the time you wish, Senator. Just so we have a clear understanding, it is my intention to go into open session at 3:30. I am going to ask the same witnesses, Dr. Wade and General Davis, to make a short statement in open session, tracking what the Secretary of Defense said with respect to the overall Presidential budget on national defense and the decision to scale down this system, and the reasons why. So that we have an open session parallel, side by side, the President's budget justification for the decision, and that will be followed by witnesses, I understand, that may take a different point of view.

Senator **Exon**. Thank you, Mr. Chairman. I think we can move along and finish up here quite rapidly.

I guess I will address this question to the general and also to Dr. Wade. Given the fact that we are right now entering into strategic arms control negotiations with the Soviets, and given the fact that if those talks are successful it is assumed that we would have to give up something. Would it not be wise, at least from the perspective of keeping the Titans, aside from the other reasons that we have discussed, would it not be smart to keep those as a negotiating position for our arms control team? What do you know that either Mr. Rostow or General Rowny have to say as our chief negotiators on our unilateral decision to start withdrawing the Titans in October?

General **Davis**. I assume the START talks will get under way next month or the month after.

Secretary Wade made a very telling point, that is, the Soviets know that we intend to phase out the Titans. We started to phase them out back in 1974 and did not. I am not sure they play that kind of poker. They did not save their SS-9's or SS-11's for a negotiation, they went ahead and converted them to SS-18's.

So, my personal view is, I am not sure the Soviets would even play that kind of poker; but Dr. Wade may have a different view.

Dr. **Wade**. Senator, I might note here also that the launchers are going to be placed into a caretaker status. The SALT I agreement, that is the Interim Agreement, and in large measure the followon agreement, defines and limits the launcher itself, not the missiles that go in the launchers. So, as long as we keep the launchers in a caretaker status, they do have some value in [deleted]. Presumably they are in storage and they could be used again.

One could argue that a truly viable agreement takes more than a launcher count, as far as adequate verification is concerned. But as far as the current instrument is concerned, keeping these launchers in a caretaker status maintains the option to use them again in the future.

So, that is one reason why we will be holding, in such a status until START commences and we see where these pieces fit in the plan.

Senator **Exon**. Turning to another matter. General, there has been a rumor around—and I would just like in this secret session to spike it if we can or give you a chance to answer a question. There is a rumor around that this week in a speech you indicated directly or indirectly that those who were "pro-Titan" were actually "anti-MX."

I cannot believe that you made that statement, and I would just like to give you a chance to clarify it.

General DAVIS. I do not recall the circumstances.

Senator EXON. In other words, you made no such statement.

General DAVIS. In a speech, no.

Senator EXON. Otherwise than in a speech?

General DAVIS. Otherwise? I do not ever remember making the statement.

Senator EXON. Major, I appreciate very much your briefing again today, and essentially it was—at least the formal part of the presentation—what I was shown when I was at SAC. Incidentally I believe, just to set the record straight, I think I was there in January instead of December. I do not think that is too much different but I think it was sometime during the first part of January.

In any event, I got the impression there that day that there were officers in the SAC Command that did not share some of the enthusiasm that has been generated in some circles for the elimination of the Titans.

What was the name of the officer who gave me the actual briefing on the Titans that day?

Major VAN TIEM. That was me, sir.

Senator EXON. That was you. And do you remember that I said when you finished the briefing, showing us how important the Titans were, I said, "If the Titan is that good a missile, maybe we should do away with the MX and just go ahead with more Titans." Do you remember some general statement like that?

Major VAN TIEM. I am sorry, sir, I do not remember.

Senator EXON. You do not remember that. I remember it very well and there was considerable laughter in the room at the time. The answer came back, "Well, it is not that good." I suspect it is not that good.

So, I for one am not saying that under no conditions whatsoever should we every phase out the Titans because obviously we are going to have to do that some day. I still continue to question whether or not it is a viable, good option at this time, either from the standpoint of military strategy and planning or from the standpoint of the proper expenditure of the taxpayers' dollars.

When we had that chart up to show that we were going ahead with the air-launched cruise missiles, can you give me a cost figure on that, what that is going to cost? In other words, you showed in the process of phasing out the Titans we were going to fill in the "window of vulnerability" with these other missiles. There has to be a cost connected with that. Can you give it to me?

General DAVIS. It is the 5-year program for air-launched cruise missiles which the Congress has approved. Because we are procuring cruise missiles they will be used here as only one example. The cost of Minuteman III replacing Minuteman II, is also a part of it. These are approved programs.

Senator EXON. But you cannot give me what the cost figure would be.

General DAVIS. I do not recall the cost of the number of cruise missiles we are going to procure in 1983, but that is easily gotten from the budget exhibit. We can provide that for the record.

[The information follows:]

The Air Force will procure 440 air-launch cruise missiles in fiscal year 1983 at a cost of $646M. This cost includes cost of the missiles and associated support equipment.

Senator EXON. I would appreciate that for the record; I think that might be helpful to us.

Dr. WADE. Senator Exon, may I offer my observation on your question of the additional $500 million?

Senator EXON. Sure, Dr. Wade.

Dr. WADE. If you look at the results from a Soviet first strike [deleted] against the 52 Titans, I would expect there would be on the order of [deleted] Titans surviving [deleted] that would be of any effective value following a first strike.

It is in this context of endurance and increased deterrence where you have to make this call as to the value of an additional $500 million.

I would prefer to put $500 million in, for example, a program of trying to accelerate one of our new systems, C^3 some of the other pieces that we have coming in the outyears; for example, the D-5 or the MX. We have here two viable systems that will last and be effective over time.

Senator EXON. Well, of course, we are right back to the situation; that is one of the concerns that some of us have with regard to what we see is the vulnerability of the MX, by putting it in what I am sure we all recognize are very vulnerable silos.

General DAVIS. But the silos they go in are far less vulnerable than the Titan silos, Senator Exon. We are talking about [deleted].

Senator EXON. That is true, General, but you know, every time this matter comes up you seem to get defensive. I guess that I cannot quite understand that why, with the situation that theoretically confronts us we are not saying we should do some of these things in addition to, rather than drawing down on the Titans at this time.

What you are trying to tell the committee, as I understand it, that you think we are going to close the window of vulnerability, essentially, by phasing out the Titans. My prerogative, my thoughts at least at this time—I am still unconvinced although I want to continue to study it—that maybe we should be doing the additions thereto that you have outlined, plus keeping the Titans.

Which brings me, Mr. Chairman, to my last question.

General, assuming that you knew right now that the Soviets were going to launch a first-strike attack at us in 1985, would there be any consideration given to taking out the Titans now under those conditions?

General DAVIS. I do not think it makes any difference. In 1985, you will still have some Titans in the inventory [deleted] plus, you will have additional systems.

Senator EXON. Well, what additional systems would you have?

General DAVIS. You will have ALCM and another 50 Minuteman III's, and an additional 100 Minuteman warheads.

Senator EXON. I am assuming once again, General, that we would have those anyway. All I am saying is, given the assumption, the scenario that we would go ahead exactly as you have planned, and I do not know that I have any quarrel with that; my question is that if, given in December 1985, for example, we knew that the Soviets were going to strike, I suspect that the answer would be or should be, "No, we would not be taking any of those out of the ground and covering up the holes at this time."

If that is not true, correct me.

General DAVIS. Senator, can I go back to where I started? Given unlimited resources I, as a field commander, would like to keep everything until we get something new to replace it. Now, I do not know how to put it any more simply than that.

Senator EXON. Well, I guess we got at it earlier when you said if we could give you $500 million added on to your budget, you would like to keep it.

General DAVIS. Yes.

Senator EXON. Thank you, General, thank you, gentlemen, and thank you, Mr. Chairman.

Senator WARNER. Thank you, Senator Exon.

I want to clarify a few points from previous testimony on a different subject. Senator Nunn from Georgia put questions relating this data base that General Ellis provided in previous testimony; that is, data that compares Soviet strategic capability in a number of key criteria, including residual weapons and equivalent military damage, EMD.

Do you recall that dialog?

General DAVIS. Yes, sir. I believe I put the latest analysis in the record on November 4, 1981—the comparison charts. The latest version was submitted in November 1981.

Senator WARNER. We want to flesh out the record here. It seems to me I recognize you did provide such a comparison in your testimony before the committee in the fall of 1981.

General DAVIS. Yes, sir.

Senator WARNER. Have the calculations you made in November 1981 changed and whether they have or not, will you submit your current projections so that the record of these hearings will be complete?

General DAVIS. Yes, sir. They have not changed. We are redoing them to reflect the current strategy which is reflected in [deleted]. I will be happy to provide the latest version which is the same as the November version, and then update it as soon as possible. The question there had to do with, Senator, as I recall——

Senator WARNER. Let us just put that in the record so we can meet this 3:30 deadline.

General DAVIS. Fine.

[The information follows:]

SAC'S COMPARATIVE FORCE ANALYSIS

SAC's analysis of the comparative strategic balance has not been abolished. In fact, we are currently updating our model to incorporate new strategic doctrine.

Our latest complete analysis of the Reagan Force is synopsized in the document I submitted during testimony on 4 November titled "Comparative Strategic Force Analysis." This document compares the relative contributions of the Carter and Reagan Forces using dynamic measures of military damage expectancy (MDE) and residual weapons. With the exception of very minor changes in the planned Reagan force structure, our assessment of relative U.S. and Soviet Warfighting capabilities has not changed from the balance depicted in the 4 November submission.

SAC will continue to update its analytical model to reflect our strategic modernization programs and doctrine. We will certainly provide an updated analysis when it is completed.

Senator **Warner**. Would you provide the committee your views on the degree to which deployment of MX missiles in nonsuperhard Minuteman silos, as proposed by the President, would provide a greater incentive to a Soviet preemptive attack than a deterrent to such an attack?

General **Davis**. Yes, sir. I will repeat that, I gave that point a few moments ago when I talked about MX, the fact that it had far greater accuracy than anything we have now would put the fourth generation Soviet ICBM's, particularly the [deleted]. MX in Minuteman silos will provide us with a system that can maintain a high alert rate, and be responsive, reliable, and accurate. They will provide us the deterrent capability that we need against those [deleted].

Senator **Warner**. The question is on the destabilization.

General **Davis**. Yes.

Senator **Warner**. There is a theory that placing them in that sort of vulnerable launch pad——

General **Davis**. Is this destabilizing?

Senator **Warner**. That is right, it invites attack.

General **Davis**. I, of course, argue with that because you will have 400 warheads which will not begin to give you a first-strike capability against the Soviet ICBM force.

My definition of a first strike capability and I am sure it is a fairly accepted definition—is that the attacker better have enough capability so that the enemy cannot retaliate. With only 400 MX warheads against [deleted] you do not have a disarming first-strike capability and, therefore, I do not consider the MX destabilizing.

Senator **Warner**. Secretary Wade, will you try the same question?

Dr. **Wade**. Yes, sir.

Senator **Warner**. I just want both of you to have it in the record here.

Dr. **Wade**. Let me note that by deploying the MX that we will force the Soviets to divert resources toward protecting their ICBM's, their command-and-control facilities. Such resources devoted to Soviet force survivability are resources not available for Soviet offensive force expansion. I think this is an important point. The Soviets will no longer be able to regard their missile silos and their hardened command-and-control facilities as sanctuaries immune from ICBM attack.

Next, which I think is a new point, is that the Soviet planner in structuring his forces toward a preemptive first-strike capability will find that he is facing a comparable hard-target, time responsive U.S. capability. Thus he will no longer have the freedom to plan and deploy with high confidence those force elements, such as jammers and other ECM techniques whose time-sensitive employment could highly stress and more easily defeat U.S. defensive systems. My personal judgment is that Soviet planners are in all probability more "belt and suspender" types than their U.S. counterparts. As a result, U.S. deployment of the MX system, even before a highly survivable, enduring basing mode is in place, will significantly complicate Soviet planning and thus increase, in a major way, the effectiveness of our deterrent.

Finally, by having an active production line for the MX, we foreclose the Soviets from considering a major, unanswered stepup in their strategic offensive forces. That is a Soviet breakout designed to achieve a significant strategic advantage.

Now, in the sense of stability we should also look at this deployment in the context of our total force. By that time, that is 1986, we will be deploying the B-1B bomber; we will have the new ALCM, our new force modernization coming on line in heavy numbers at that time. We will be seeing very significant improvement in our command, control, and communications.

The D-5 will be coming on line thereafter. The Soviets will be seeing that acquisition. So, its the force structure as a whole that they will see. In these constructive measures that I have identified here for the interim MX, the total aggregate improvement in our force ends up increasing the deterrence value across the board—whose purpose is to stop the ever-increasing Soviet Arms race.

We should see a thrust through this new program toward forcing the Soviets to spend their money in the right direction. That is, the B-1B and the ATB program should turn over the current Soviet air defense. We should see on the order of $100-plus billion required to just start reacting to this new force element.

As the MX program comes on line, they might move toward a system like the one that we are talking about, a $20 to $30 billion new basing program which in effect is more stabilizing.

Finally, with the D-5 program coming online, could force the Soviets to spend additional billions of dollars in an area that, in one sense, is relatively benign.

So, deploying the MX as fast as it comes off the production line, makes good sense in the context of what we are pursuing, improved deterrence, and as soon as possible.

Senator **Warner**. One further question. Would the retrofitting of the entire Minuteman III force with the AIRS as the advance guidance, and the Mark 12-A warhead do more or less to destabilize the strategic balance?

Dr. **Wade**. Mr. Chairman, I would argue—as we have been discussing earlier about the Titan—that it does add to our capability. It makes the Minuteman force offensively more viable. But again, where does that single improvement fallout in the line of priority? It would be a plus; you have a hardened silo with an improved weapons system; but I believe that with a new ABRV the MX program, that needs additional money, that this significantly more improved capacity we get from the MX system has a much, much higher priority.

General **Davis**. The point is, you do not get the AIRS guidance system, the ABRV or the MK 12-A on the Minuteman III for nothing. There are additional power requirements and possibly, silo modifications. We have some very, very preliminary costs estimates that run in the neighborhood of $10 to $12 billion, Senator. So, that does not come cheap, and it does not get to the fundamental issue—solving the vulnerability problem.

Senator **Warner**. Senator Exon.

Senator **Exon**. Two quick questions, Mr. Chairman. We all sometimes get confused when we have open and secret sessions, especially on the same day. I assume that this is not classified and I would just like to ask now, the general has made a good case for his position. He has said, though, that if we could find an extra $500 million over 5 years—which I take it would average $100 million a year—that he thinks it might be a good idea to keep the Titans.

I assume that is not classified or secret.

Senator **Warner**. Well, if I understood the general, he said that if he had another $500 million over 5 years he would like to—I want to clarify this for my own mind—he might put that money in other places. I did not understand you to say that the Titan would be your first priority with a fund of $500 million over 5 years.

General **Davis**. That is right. If I had $500 million I believe we could accelerate new systems.

Now, on the point, "If we gave you $500 million over and above all of the TOA and we earmarked it for Titans," I would have no problem with that.

Senator **Warner**. The key there is earmarked. I am not so sure that is what Senator Exon is talking about.

Senator **Exon**. That is exactly what I am talking about, if we earmarked it, he said we could use it. He thinks it would be helpful, if it was over and above everything else.

Senator **Warner**. Now I have the question.

Senator **Exon**. Now, one last question. General, when you were talking about the hard target kill capability that we have—and I recognize that is critically important—maybe I misunderstood but I thought that in the figures that you gave us you may have been talking about the MX potential.

In addition to the MX, will we not have 900 Mark 12-A warheads on the Minuteman III's [deleted].

General **Davis**. We have the Mark 12-A [deleted].

Senator **Exon**. [Deleted.]

General **Davis**. [Deleted.]

Senator **Exon**. Because of their accuracy?

General **Davis**. [Deleted.]

Senator **Exon**. What is the increased accuracy in feet on the average between the Mark 12-A and the new MX, how much?

General **Davis**. From [deleted].

Senator **Exon**. [Deleted.]

General **Davis**. Yes, sir, and the knee of the curve is approximately [deleted].

Senator **Exon**. Thank you. Thank you, Mr. Chairman.

Senator **Warner**. Thank you very much. Let us all take a 5-minute break and then we will resume with the open hearing.

[Whereupon, at 3:32 p.m. the subcommittee recessed, to reconvene in open session.]

OPEN SESSION

The subcommittee reconvened in open session at 3:40 p.m., in room 212, Russell Senate Office Building, Senator John W. Warner, chairman, presiding.

Present: Senators Warner, Exon, Levin, and Dole.

Senator **Warner**. The subcommittee will now resume in open session.

It has been the desire of the Chair and subcommittee members to try and have both open and closed sessions, thereby enabling the public to learn as much as possible about strategic programs and the necessity for the buildup which is afforded an opportunity by the President's budget.

This afternoon we will have testimony from General Davis, Commander in Chief, Strategic Air Command, and Dr. Wade, Principal Deputy Under Secretary of Defense for Research and Development.

Specifically, the subject this afternoon relates to the President's recommendation to Congress that, as we begin the build-up in our strategic systems, certain systems have to be phased out. He has elected to phase out the Titan system over a period of 5 years, the first nine units to be phased out in fiscal year 1983.

This panel of witnesses will be followed by another panel consisting of General Dougherty, former Commander in Chief of the Strategic Air Command, and he will be accompanied by Mr. James Litsey.

Do you have an opening statement, Senator Exon?

We were happy today to have Senator Stennis with us and Senator DeConcini. Senator Dole will be joining us momentarily.

Senator Exon. Thank you, Mr. Chairman. I, of course, thank the witnesses for appearing once again. We have had a very interesting and informative closed session.

WINDOW OF VULNERABILITY

I am delighted that you agreed to hold this session at basically my request. I happen to feel that with the "window of vulnerability" we face, that we should look very long and very hard at unilateral disarmament of the part of the U.S. Government as we look forward to the ever-increasing threat from the Soviet Union.

My basic concern, Mr. Chairman, is that during a time when the Soviet Union is aiming twelve additional warheads at us or our allies, we are beginning what I term unilateral disarmament by beginning to pull out one-third of our total megatonnage represented in the form of the Titan missiles.

I recognize that the Titans are going to have to be phased out at some time, but I am very fearful that we are throwing open even wider the window of vulnerability by this action, especially when we recognize that we have received testimony time and time again that we could indeed continue to have the Titan in place, each one of them with a nine-megaton warhead, for an additional cost of $100 million per year for the next 5 years.

I think it is important that we continue to upgrade our forces. I am not for cutting back, basically. I really feel that we should be maintaining Titans at least until such time as we have the MX deployed in some kind of an acceptable basing mode.

Thank you, Mr. Chairman.

Senator Warner. Thank you, Senator Exon.

We are joined here today by Senator Dole. Senator Dole?

Senator Dole. Thank you very much, I will just take a minute. We have important witnesses and I want to hear what they may have to say. I have not heard some of the discussion concerning some of the aspects of the Titan II's, but those of us with Titan missiles in our States have been concerned about the future of the Titan system since August 24, 1978.

Most of my colleagues, perhaps, had forgotten about the 54 silos—not on this committee but maybe in other committees—until the fatal accident at the Rock, Kans., site in the fall of 1978. Since that day, many of us, the Senators from Arkansas and the Senators from Arizona joined those of us from Kansas concerning not so much the military aspect but the safety of the Titan missiles, and particularly the safety of those who live in the area.

We have had a steady string of fuel leaks and accidents since that time, and I am certainly pleased that we are having these hearings where we can focus on the concerns raised by Senator Exon and the concerns raised by those of us who represent States where the Titan II's are located.

I think the first requests for hearings go back to October 1, 1979, when I was joined by Senator Kassebaum asking that we at least discuss the safety aspects. I think subsequent events have borne out some of the concerns expressed not only by those of us who have Titan II's in our States, but others on this committee and others who are not in the legislative branch.

So, I think our concern would be not whether we should retain the Titan, but how quickly we can phase them out, and whether or not in that interim period—the phaseout period—there will be total safety.

I think I will just ask that the rest of my statement be placed in the record, Mr. Chairman.

[The prepared statement of Senator Robert Dole follows:]

STATEMENT BY SENATOR ROBERT DOLE

CONCERNED SINCE 1978

Those of us with Titan II missiles in our States have been concerned about the future of the Titan II system since August 24, 1978. Most Senators had forgotten the 54 silos until the fatal accident at the Rock, Kansas site in the fall of 1978. Since that day, the Senator from Kansas has been worried about the danger the missiles pose to the personnel who man the Titans and the civilians living near the sites. A steady string of fuel leaks and accidents in subsequent months reinforced that fear and prompted serious investigations, both private and official.

These investigations brought to our attention serious questions about the reliability of the aging missiles and the strategic importance of retaining them. This prompted me to call for their removal in September of 1979.

ASKED FOR HEARINGS IN 1979

As far as I know, this Senator was the first to ask for an Armed Services Committee hearing into the safety problems and strategic role of the Titan II missiles. Back on October 1, 1979, Senator Kassebaum and I wrote then-Chairman Stennis requesting such a review of safety and military need.

Subsequent events have borne out our concerns, and the Department of Defense has now outlined plans to retire the outdated missiles. We never did receive the hearings we requested, but defense analysts and strategic experts have decided that the unreliability and cost of the Titan II missiles outweigh any important military basis for retaining them.

There are those who now want to reopen the debate on the future of the Titan II missiles. The hearings we requested 2½ years ago are now being held in a matter of days.

SHORT-TERM SAFETY IMPROVED

Public and congressional pressure has prompted significant Air Force effort to improve the safety of the Titan II system. This Senator now believes the missiles will be relatively safe for the duration of the planned five-year phaseout. But deteriorating liquid-fuel missiles can be maintained for a limited time before their safety and reliability will again be questioned.

STRATEGIC NEEDS CHANGED

Strategic importance is now the central question. Our strategic priorities have changed along with our military needs since deployment of the Titan II missiles nearly two decades ago. Now, both accuracy and invulnerability have superceded megatonnage as our top requirements where our strategic doctrine once prioritized the hitting of soft targets, it now favors the hitting of missile sites. These factors have raised doubts in my mind about the need to keep the Titans.

I trust that President Reagan has correctly decided to retire this outdated system. Let's focus our efforts on an efficient phaseout and the development of our next generation of strategic weapons.

Senator DOLE. There is no doubt about it that strategic importance is a central question. Our strategic priorities have changed along with the military need since development and deployment of the Titan II missiles nearly two decades ago. I just hope that we can focus on some on the safety aspects as well as the strategic aspects.

Thank you , Mr. Chairman.

Senator WARNER. Thank you very much, Senator Dole. General Davis.

STATEMENT OF GEN. BENNIE DAVIS, USAF, COMMANDER IN CHIEF, STRATEGIC AIR COMMAND

General DAVIS. Thank you, Mr. Chairman, Senator Exon, Senator Levin, Senator Dole. I welcome the opportunity as Commander in Chief of the Strategic Air Command and Director of the Joint Strategic Target Planning Staff to appear before you today to discuss the proposed deactivation over a 5-year period of the Titan II missile system.

As I discussed with the committee back in November 1981, all other things being equal and unlimited resources, it would be my preference as an operational commander to continue the Titan II until the MX is deployed.

But as you are well aware, the Air Force as well as the Congress face a similar problem—that of allocating limited fiscal resources among many competing and urgent requirements.

In response to these fiscal constraints, the Air Force reluctantly placed the Titan II weapons system on the list of budgetary trade offs in order to finance strategic modernization—that being improved connectively, B-1 and advanced development on the advanced technology bomber, the D-5, and the MX missile.

By phasing out over a 5-year period, beginning this fiscal year, we will save $500 million in terms of budget.

Because we are gradually phasing this weapons system out and because we are phasing additional systems in—namely the air-launched cruise missile; additional Minuteman III's with additional warheads; ultimately B-1 and MX's, there will not be a unilateral disarmament, there will be additional weapons deployed to replace the Titan II.

As to the safety and supportability, as you may or may not be aware, I headed an Air Force team—I was not then commander of SAC—I headed an Air Force blue ribbon committee that spent 5 months after the accident at Damascus, Ark., looking at the safety and supportability of the Titan II weapons system.

It is an old system but we found it safe and supportable. We had some 200 recommendations for either revised procedures or equipment, safety equipment, to keep the system safe and supportable. The Air Force has acted on 150 of those recommendations.

My determination is that we can safely operate the system through the phaseout period and do it with assurance to the civilian community. In the meantime certain devices, certain warning devices, will be available to warn the civilian community and the relationships, I can guarantee, between the base people and the people who live in the area will be very, very close as they have been since the accident at Damascus.

So, in summary, we will be phasing the system out and in order to finance the modernization requirements for our strategic improvements, the system will phase out over a period of 5 years. It will remain available, those warheads that remain through the 5-year phaseout period, into 1987.

We do not believe it is unilateral disarmament. We are bringing on new systems to replace the Titan II.

Thank you very much, Mr. Chairman.

Senator WARNER. Dr. Wade?

STATEMENT OF JAMES P. WADE, PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Dr. WADE. Thank you, Mr. Chairman.

It is an honor and a pleasure to be here once again with you and your committee. I would like to make several observations from the perspective of the Office of the Secretary of Defense.

In structuring our comprehensive strategic modernization program, the Secretary of Defense recommended, and the President approved, the phased retirement of Titan quite simply because they believe under a constrained budget Titan no longer contributed enough to deterrence to justify its cost.

To explain this position, I would like to make the following points:

While the safety and security of Titan is considered acceptable, our goal is to improve the safety of all of our nuclear systems. We thus need to phase out older systems designed to less demanding standards.

The Congress has, of course, been most supportive of this approach and has, for example, encouraged us to use insensitive high explosive on our new land-based missile force.

The avoidance of hundreds of millions of dollars over the next 5 years and the freeing of large numbers of scarce military technicians are welcome contributions as we seek to modernize our forces in the most cost-effective manner possible.

Finally, the notion that from a military standpoint Titan could be retired is not new. I recall that as early as 1974 there was general approval within the Department of Defense for phasing our

Titan out of the inventory. Such a step was not taken largely due to arms control negotiating considerations.

In sum, the phased retirement of Titan is consistent with the President's stress on modernization, endurance, and over-all effectiveness of our strategic forces in the most economical and expeditious manner possible.

Deterrence is our goal, and enduring survivability as a force modernization priority is our standard. I would note here that the D-5 SLBM, the B-1B/ATB program, the MX, the C^3, and improved strategic defenses all fit key criteria toward enhancing the survivability of our forces.

This is the important point, and is our priority as we move forward to improving our deterrence vis-a-vis the Soviet Union.

Thank you, Mr. Chairman.

Senator **Warner**. Thank you very much. Senator Dole.

Senator **Dole**. Well, as I understand, General Davis, you have no concern about the safety of the Titan system?

General **Davis**. Sir, I believe we can operate the system safely. It is supportable. The two tragic accidents at Rock and Little Rock—were caused by human error, failure to follow checklist or technical data procedure.

We have tightened that up. It is not absolutely foolproof, no system that involves human beings is. But there has been a reemphasis. I would not care to guarantee beyond the shadow of the doubt there will never be another incident, but I am certainly very confident that we can operate the system very safely.

Of the large number of leaks most were very, very small leaks. We will finish replacing all of the seals on the Titans this month. Lately we have had almost zero leaks.

Senator **Dole**. As I understand it, we will still have 10 Titans in place by the time the first squadron of 40 missiles are in place; is that correct?

General **Davis**. We will have 11 in place by the time we get the first MX's in place.

Senator **Dole**. That will be when, late 1986?

General **Davis**. Yes, 1986.

Senator **Dole**. I assume that if there is some world crisis, the phaseout of the Titans could be delayed? I mean once you commit——

General **Davis**. We can stop at any time.

ACCURACY OVER MEGATONNAGE

Senator **Dole**. As I also understand it, megatonnage is not so much the question these days as accuracy; is that correct?

General **Davis**. That is correct, sir.

Senator **Dole**. And the Soviets, of course, do have more megatonnage than we have and will have more.

General **Davis**. And the Soviets have also gone away from the very large warheads to the smaller, more accurate systems.

Senator **Dole**. Now, about the decision to phase out the Titans—it has been under consideration, Dr. Wade said, since 1974. I believe during that period of time they were left in place as a bargaining chip of some kind during the SALT negotiations. That may or may not be an accurate conclusion.

But does the phaseout in any way reduce our actions in the START talks, the START negotiations?

Dr. WADE. Senator, the answer to your question is no. The launchers from which the missiles will be taken will be kept in a caretaker status.

You will note that the provisions of the agreement, both the interim agreement and the followon agreement, focused on the control of the numbers of launchers. These Titan launchers will be maintained in a caretaker status, and therefore they will have some viability as far as followon negotiations are concerned.

Senator DOLE. I appreciate very much, Mr. Chairman, your permitting me to ask questions. I am not a member of this committee but do have, I think, a rather special interest in the Titan. Also, of course, since Congress withheld funding from hardening existing silos, that probably also reduces the options on the Titans.

We are concerned and will be concerned because the people who live in our States are concerned because of Damascus. I think if Senator DeConcini were here he could tell you that they are now in Tucson's backyard, so they have a different concern.

General DAVIS. Yes, sir, I am very familiar with Senator DeConcini's concern. More than that, the Air Force wants to be a good neighbor for the people who have supported us in Kansas, in Arkansas, and in Arizona. They have been very good neighbors and very tolerant over the years. We want to do the best for them, Senator.

Senator DOLE. I think I can say without qualifications, you have been a good neighbor. But there are always questions raised and there are claims being filed now by some in our State claiming injury because of some of the leaks. But I do not question the efforts that you have made, or that the people you represent made over the years.

Thank you, Mr. Chairman.

Senator WARNER. Thank you, Senator Dole.

Just one question, Senator Exon, since we are on the subject of safety.

TITAN II SAFETY MEASURES

It would be helpful if you put in the record what safety measures were taken to protect the present system and, if this decision to phase out were to be delayed or reversed, would you then commence a second series of safety measures?

General DAVIS. Yes, sir. We did not forgo any of the critical safety items, those continue to go in the systems that will remain online until they are phased out.

Senator WARNER. You might mention what they were.

General DAVIS. Well, I do not have them at hand, but I can certainly provide them for the record. I would be glad to.

[The information follows:]

Senator Warner, more than 350 recommendations devolved from four separate studies of the Titan system after the accident in Arkansas. These recommendations were consolidated into about 233 action items. The SAC staff established a priority sequence and secured funding to complete the program as soon as possible. By Oct

81, before the deactivation decision was announced, significant progress had been made. More than 60 percent (144) of the action items were completed, 8 had proven infeasible, one was consolidated with another action item to facilitate contractual arrangements, and the remaining 80 were being pursued on a priority basis.

After Titan II deactivation was announced on 2 Oct 81, the Air Staff directed that we limit modifications to those specifically required to assist in propellant handling and downloading. The SAC Council reviewed the 80 action items in progress at that time and stopped action on 23 because their high cost and projected completion dates would not have made them cost-effective or beneficial during the deactivation period. The remaining 57 action items are projected to be completed by Oct 82, to insure the system will be as safe as possible during this period of increased propellant handling.

As to specifics on the safety measures that have been completed, only 42 of the 233 action items discussed above involved hardware purchase or modifications to existing equipment. Of those 42, 8 have been completed:

(1) Warning sirens have been installed at each missile site.

(2) Mineral oil tanks have been installed at three sites in Arizona where the population has spread to areas near the missile to provide immediate vapor suppression capability. A tanker truck is available at each wing to cover the other less time-sensitive sites.

(3) Special donut-shaped dropcloths are now in use to prevent dropped objects from causing damage to the missile.

(4) Emergency Notification Team (ENT) vehicles equipped with radios, sirens, and public address systems now accompany each propellant convoy to enhance civilian warning or evacuation.

(5) Speed dialing phones have been installed in each Titan Wing Command Post and names and phone numbers for residents around each Titan site have been compiled.

(6) ENT vehicles are now on site during propellant operations.

(7) Upgraded radio systems have been installed in each Titan launch control center to improve crew communication and reaction to emergency situations.

(8) All tools used in the launch duct have been evaluated, unnecessarily heavy tools have been redesigned or replaced, and effective restraint lanyards are now used to prevent dropped tools from causing damage.

The remaining 191 non-hardware related action items involved maintenance or operational procedural improvements, manpower increases, incentive pay measures, or budget funding support initiatives. Significant improvements in this category are:

(1) Pay incentives to improve retention of experienced propellant transfer technicians have been implemented. Reenlistment bonus has increased retention of first term airman from 17 percent in fiscal year 1980 to 67 percent in fiscal year 1981.

(2) Detailed public education programs have been implemented to improve communication with residents in the vicinity of Titan sites.

(3) Many technical orders and maintenance procedures have been clarified or expanded to make them more useful in emergency situations.

(4) Maintenance supervision has been increased, especially during propellant operations and maintenance inside the launch duct.

(5) Several studies have been conducted to improve actions to contain, neutralize or cleanup propellant spills.

(6) Elaborate civilian notification and evacuation procedures have been implemented in coordination with local and state offices of emergency services.

(7) Funding initiatives have been successful in securing adequate budget levels to support the Titan Air Logistic Center's efforts, especially in service engineering.

With regard to the last part of your question, if the deactivation program were reduced or delayed, it would be necessary to reinitiate the 23 action items that were cancelled. The major high cost items are the new missile procedures trainer ($22M), Launch Control System upgrade ($26M), New Vapor Detection System ($30M), fixed piping for mineral oil insertion at each site ($7M), Negative Propellant Tank Pressure Relief Valve ($9M), Titan Missile Overhaul Program ($11M), additional Propellant Transfer System Trainers ($5M), New Rocket Fuel Handlers Clothing Outfits ($5M), and Safety Upgrade Modifications to the W-53 Warhead ($7M).

It should be noted that these improvements, which were to be completed over the next four to five years, were not "short-term" fixes.

Senator **Exon**. Mr. Chairman, if I might be helpful. I have the safety report from the study team that General Davis headed with me. I was going to introduce it as part of the record, I think basically these points are covered. This is an Aviation Week article of February 2 that has, I think, the total report in it.

I would like to introduce that as part of the record at this time together with letters from General Dougherty and former Secretary of Defense Harold Brown.

Senator WARNER. They will be made part of the record.

[The information follows:]

PANEL ASSESSES TITAN 2 MISSILE'S SAFETY

(Analysis by a 62-member U.S. Air Force Review Group of the Sept. 19, 1980, Titan 2 missile explosion accident near Little Rock AFB, Ark. (AW&ST Jan. 12, p. 23) began when Air Force Secretary Hans Mark ordered a definitive assessment of the weapons system's safety and supportability now and in the future. And evaluation of the Titan 2 weapon condition and safety report was prepared by Ogden Air Logisitics Center. An executive committee, directed by Ger Bennie L. Davis, commander of the Air Training Command, with advice from Lt. Gen Howard M. Leaf, Air Force Inspector General, was formed to provide senior level guidance. Members were Eugene H. Kopf, USAF principal deputy assistant secretary for research, development and logisitics; Maj. Gen. William W. Hoover, director of military application, Dept. of Energy; Maj. Gen. John J. Murphy, commander, Ogden Air Logistics Center; Dr. Richard Wagner, assoicate director for nuclear testing, Lawrence Livermore National Laboratory, and Col. Walter S. Yager, commander, 6555th Aerospace Test Group. Because of the importance to the U.S. strategic defense Triad of the Titan 2 system, Aviation Week & Space Technolology is reprinting the review group report in full.—Ed.)

The Titan 2 weapon system is safe and supportable. Since its initial deployment in 1962, the missile and related support equipment have been adequately maintained and kept current to meet safety and operational requirements. The physical condition of the missile is good. Some support equipment has deteriorated, but has been kept adequate through review, repair and replacement as necessary over the years. The launch crews have the technical knowledge and training to ensure the safe, effective operation of the system. Maintenance procedures are basically sound, and maintenance personnel are capable of providing required support safely and efficiently. The result is that overall system safety has been maintained at acceptable levels.

While the system is assessed basically safe, it also is potentially hazardous, and there can be no guarantee that accidents will not happen. An a consequence, an extensive crisis management capability with effective public safety procedures is in place and being further strengthened to provide an added margin of safety. Interface with responsible public officials and the press also is being refined to assure responsiveness and candor in the event that another accident should occur. At the end of this report, major recommendations found in the appendices are summarized. They are intended to better assure system currency in the future, and to extend the margin of safety for accident prevention and response. Overall, with proper funding and reasonable priority, the Titan can remain a viable, safe and supportable part of the nation's strategic deterrent posture.

BACKGROUND

The Titan 2 weapon system was first deployed by the Air Force at Davis-Monthan AFB, Ariz., in December, 1962. Shortly after, two other wings, with 18 launch complexes each, were established at Little Rock AFB, Ark., and McConnell AFB, Kan.

The Titan 2 weapon system consists of an inertially guided, liquid fueled, two-stage intercontinental ballistic missile (ICBM) and associated ground equipment necessary to maintain the missile in its underground launch complex. The launch complex encompasses both aboveground (topside) and underground facilities. Aboveground facilities, for example, include communications antennas, vehicle parking areas, security fencing, lighting and surveillance systems, weather instruments, propellant and electrical connections and an access portal for entry into the underground portion of the launch complex.

The underground facilities include the missile silo, blast lock area, interconnecting cableways and launch control center. The missile silo is a nine-level area, 146 ft. deep and 55 ft. wide. The Titan 2 missile, in its environmentally controlled atmosphere, is suspended in the launch duct in the center of the missile silo. Various support equipment is situated on nine separate levels to provide electrical power, air conditioning and ventilation, environmental protection, and hazard sensing and associated corrective action. A walkway or cableway extends from the missile silo to the blast lock area. The blast lock area provides protected entry from the access portal to the hardened facility and between the launch control center and the missile silo. The launch control center (LCC) is a three-level, shock-isolated cage suspended from a reinforced, concrete domed roof structure. The majority of the equipment needed to monitor and control the status of the missile and its support equipment is located on Level 2 of the LCC.

The status of each missile and launch complex is monitored 24 hr. a day by a four-member crew of two officers and two enlisted personnel. The crew is trained in launch and emergency procedures and routinely monitors equipment operation, maintains communication with headquarters and oversees maintenance activities.

Maintenance at the missile complex is performed by technicans from maintenance squadrons at the support base. The teams of technicians travel from 20 to 70 mi. from the support base daily to accomplish repair or replacement tasks at the remotely dispersed sites.

The Titan 2 weapon system represented the forward edge of technology when it was developed, and it is still an efficient design for its purpose. Although the number of Titan 2 missiles is relatively small, these weapons represent over one-third of the total nuclear yield currently available from the land-based ICBM force. The weapon system is operated by the Strategic Air Command (SAC) to cover targets assigned by the National Command Authority (NCA) in the single integrated operational plan (SIOP).

POTENTIAL HAZARDS

The reactive, toxic nature of the propellants and the high explosive and toxic components of the warhead pose potential hazards to those residing near Titan 2 missile sites and convoy routes. Years of experience have demonstrated that the elements of the Titan weapon system posing these hazards can be effectively used and safely handled. Yet, those years also have shown that accidents are possible, and that a sustained effort must be made to prevent mishaps and contain their results. To assess past actions and present proposals, an understanding of the nature of these hazards is required.

The warhead perhaps has caused the most public concern—quite naturally, given its awesome destructive power when employed according to design. In a plausible accident environment, however, it is the most forgiving and least hazardous of the potential hazard sources associated with the Titan. Under only the most extreme circumstances could the warhead react adversely to the external stimuli generated in an accident. Even in the extreme abnormal environment experienced in the accident at Damascus, Ark., the warhead remained safe and relatively intact. Given the specifics of that accident, the warhead reacted according to its design. Because of the far-reaching consequences of a premature nuclear yield, exacting attention was devoted during design and deployment of the Titan 2 system to preclude such an event, even under the most adverse accident environments. The worst plausible outcome of such an environment would be a conventional, high explosive detonation with limited scattering of warhead components. Resultant radiation and toxic hazards would be minimal.

Less forgiving and inherently more hazardous are the propellants. Mishaps involving propellants are more likely to produce a serious hazard, and the hazard will have a greater potential to affect more of the public adversely. The warhead is ruggedly constructed and, when deployed, is encased in the reentry vehicle (RV); propellants are more dependent on the containers in which they happen to be placed. On base, on the road, and topside at the missile site, propellants are in very heavy duty, compartmented trailers which are highly resistant to damage. Even with these precautions, propellants are more likely to be released in an accident than are the hazardous components of the warhead. During operations involving propellant flow to or from the missile, propellants are routed through piping and flexible hoses from topside trailers to reside for long periods inside the missile.

The thin-skin design of the missile is necessary to provide the light weight required to reach targets over 5,000 mi. away with the large payload. The result of that design, however, is a container which is sensitive to mishandling. While steps have been and are being taken to reduce the probabilities of mishandling, the possibility of inadvertent propellant release remains a concern which must be clearly understood and carefully avoided.

The fuel, an equal mixture of hydrazine and unsymmetrical dimethyl hydrazine (UDMH) called Aerozine 50, poses the less serious hazard of the two propellants.

Should it be released in an accident, it can create irritations in small concentrations and more serious injury in massive doses. It is colorless, flammable and, in certain vapor concentrations, explosive. It is hypergolic (ignites upon contact) with the oxidizer.

The oxidizer, nitrogen tetroxide (N_2O_4), is the more dangerous propellant component. Though visible as a reddish-brown gas, nitrogen dioxide (NO_2), it vaporizes rapidly and impacts health much further downwind than fuel. Upon contact, its effects occur rapidly and are not as easily reversed as those of fuel. Liquid N_2O_4 can cause severe chemical burns. NO_2 gas can cause severe irritation to the eyes, nose and throat. In sufficient concentration, NO_2 can cause serious lung damage.

The long-term environmental impacts of the oxidizer and fuel are similar. After a relatively short period of time, both propellant components decompose to nitrates.

The most significant differences between the hazards posed by the warhead and the propellants, and between those posed by the two propellant components, are the potential evacuation distances involved. In those accidents where a nonnuclear detonation of the warhead high explosives could occur, evacuation of nonessential personnel should be 1 mi. from the point of possible detonation. Should such a detonation take place, the subsequent evacuation distance would be 300 ft. beyond the visible fragments. The most severe of plausible oxidizer accident scenarios could require a downwind evacuation corridor up to 6 mi. in length. Similar severe fuel accident scenarios would generate much shorter evacuation distances.

A major hypergolic reaction between the propellant components of the type apparently experienced at Damascus, but producing a maximum of unconsumed oxidizer under weather conditions worse than at Damascus, is estimated to generate a need to evacuate up to a 6-mi. circle, albeit with more time to initiate the evacuation. That circle reduces to a corridor when upper wind directions are known. These estimates are subject to revision, and refined engineering analyses of the dynamics of hypergolic reactions are under way at this time.

A review of the hazards places the task of assessing the safety and supportability of the Titan 2 weapon system in the proper context. Quite clearly, such an assessment requires an evaluation of the overall system's capability to prevent accidents that would generate these hazards, and to minimize undesirable consequences to those nearby should such accidents occur. Necessarily, this involves a review of those functions that contribute to the ability to both prevent accidents and contain their consequences—design safety, system currency, operation and maintenance of the system, crisis management and, as a thread connecting all these functions, the overall management structure that places emphasis on safety, evaluates the system's ability to support it, and modifies the system accordingly.

DESIGN SAFETY

The design of the Titan 2 weapon system began with emphasis on safety. The design of modifications to that system also are influenced by a continual emphasis on safety. This applies to both the warhead and the missile that carries it.

Warhead.—Warhead design places safety first when technical tradeoffs are required or funding priorities are in question. The Air Force and Dept. of Energy nuclear safety communities continue to ensure that this is the case. The Nuclear Weapons System Safety Group (NWSSG) periodically reviews weapons in the stockpile to reconsider safety, determine if hardware or procedural improvements possibly need to be made to meet more stringent or more quantifiable criteria implemented since the original design of a weapon, and set forth or revise weapon system safety rules for the weapon in question.

Even though nuclear safety may not directly contribute to operational effectiveness, the national-level emphasis given to nuclear safety concerns has insured that the Titan 2 warhead has been engineered since the outset to provide assurance against an inadvertent or premature nuclear yield.

Safety devices have added weight at some expense to missile performance in terms of range. These devices also have necessarily affected overall system reliability somewhat by increasing the complexity of the system; however, the effect is minimized by redundancy and quality assurance programs. A sequential series of independent events and actions, both before launch and during flight, must occur in precisely the right manner to produce a nuclear yield at the target. The safety devices and features provide a high degree of assurance that the warhead will not inadvertently or prematurely produce a nuclear yield. For example, in the early 1960's, before the system was fielded, a device was added to prevent electrical power from reaching the warhead in the event of a fire. Modifications and replacements also have been made in handling equipment to forestall or limit abnormal environments. For example, the new RV transporter, by carrying the RV lower, provides a more stable platform over the road. The new Pettibone crane, used in removing and replacing the RV on site, replaced a crane that was becoming unsupportable and potentially hazardous.

As standards have become more stringent, the system has moved to meet them, to continually improve system safety. The review group recommends further technical changes to the Titan warhead, to bring it into line with design practices instituted after the warhead was built, further lowering the remote chance of an inadvertent or premature nuclear yield. Also recommended are a study to determine how the conventional ordnance system in the missile might be made even less suceptible to electrical faults and a reexamination of the crane and reentry vehicle sling used in mating and demating operations to identify potential failure points.

Missile.—Safety was also a major consideration in the design of the missile. For example, missile quick disconnect fittings for the propellants were designed to eliminate any large leaks that might otherwise arise during propellant transfer operations, adding weight at the expense of range. Various monitoring circuits were built into the missile to rapidly and reliably identify potential problems, with some impact on performance efficiency. Missile sequential enabling and firing commands were required, at some cost to reliability. As with the warhead, design and modification standards have become more stringent since the basic design of the Titan 2 was completed. The missile system has applied the new standards to improve the margin of weapon system safety.

Modifications to the missile and its direct support equipment are scrutinized under the USAF system safety program. This program, instituted in its present form since Titan 2 was intially designed, requires that modifications be analyzed as to both the safety of the specific component-level chances required and, in turn, the potential safety impact of the modification on the entire program.

The USAF system safety program generated the establishment of a Titan 2 weapon system safety group (WSSG) to review modifications involving safety concerns and review and make recommendations on safety issues involving the weapon system. The Titan WSSG includes representatives from the Air Force inspection and safety center, Strategic Air Command, operational missile units, the Strategic Missile Evaluation Sqn., medical and environmental health organizations, the Air Force Logistics Command (AFLC) Safety Staff, AFLC depot system and item managers, and various civilian contractors. A WSSG program typically includes activities throughout all phases of design, development, testing, checkout, modification, production, training and servicing the subject system. Thus, the WSSG plays a key role in the Titan 2 modification development-through-incorporation cycle.

In the early 1970s, a coded switch modification was incorporated to enhance nuclear surety by providing an additional barrier to inadvertent or unauthorized launch. This modification increased system complexity by adding one more hurdle to cross in series with those already existing. This was soon followed by propellant tank pressure transducers, which provide the missile crew with a digital readout of pressure inside each of the propellant tanks. They eliminated pressure switches which had presented a potential leak point and provided only a visual warning light for a high or low pressure indication. More recently, the system has moved to replace aluminum with stainless steel poppets in the quick disconnects used in uploading and downloading propellants—to provide greater assurance that the quick disconnect will work as designed. The incident at Rock, Kan., led to this design. All three of these modifications enhanced safety, yet added weight and complexity. All were judged to be worthwhile tradeoffs.

Realistically, what cannot be done to Titan design, however, it to thicken its skin to make it more impervious to the kind of dropping incident that generated the accident at Damascus, Ark. To accommodate that concern, the system has instead looked to the design of support equipment and maintenance procedures to desensitize the system. Briefly, procedural changes already in place include lanyarding parts and tools, raising the rubber flaps around the edge of the work platforms, and lowering work platforms below technicians working in the launch duct with the missile. A safety net to place below technicians working in the launch duct has been prototyped and thr procurement process has begun.

Missile system support equipment has been modernized or replaced to enhance safety over the years. Except for real property installed equipment, these modifications are under the scrutiny of the WSSG. The most recent example stressing accident prevention is one that flows from the Damascus accident, involving the aforementioned rubber flaps around the inner edge of the work platforms. These were intended to prevent objects from falling through and eventually striking and puncturing the missile. Yet, this happened at Damascus. The possibility of upgrading these flaps and closing off present openings, along with the completed procedural changes more fully discussed in the maintenance section below, is aimed at preventing recurrence. The review group recommends that flap upgrade be quickly evaluated and implemented if the modification would add to safety. Another recent example of a prevention-oriented modification is the Chem-pump, used for propellant transfer operations, which came about as a result of lessons learned from an accident that occurred in the private sector but had application to titan 2. This effective application of the Safety program, including cross-feed and corrective action, resulted in replacement of certain internal parts of the pump which were found to be incompatible with oxidizer.

Possibly less obvious safety modifications are those that relate to limiting the consequences of an accident should one occur. This group provides particular support to such modifications, many of which have been under active consideration since the Rock, Kan., accident. But most have not yet been implemented—they take both time and dollars to deploy. The process might, however, be accelerated with sufficient priority and funding.

Those safety modifications deemed especially important are: runoff ditches and holding basins for hardstands topside to contain spills; systems to place vapor suppressants on oxidizer and fuel leaks in-silo, topside and on the road; water recirculation or renewal systems to wash down in-silo fuel leaks; exhaust shaft propellant vapor burners or scrubbers to reduce emitted oxidizer or fuel vapors; a remote (or automatic) tank venting capability, and manual overrides to water and fan controls for crew use under missile potential hazard team (MPHT) direction during in-silo hazard situations; various indicators remoted in digital form into the launch control center (LCC) to allow the crew to keep the missile potential hazard net (MPHN) advised during such a situation; and LCC modifications to allow the crew to safely remain in the control center to assist the MPHT until the situation is resolved. None of these is absolutely necessary to system safety, but all are desirable, especially for the more encroached complexes, i.e., those with high population densities in the immediate vicinity of the site. These complexes should get first priority for installation when appropriate modifications to the current system become available. Funding priority for rapidly completing development and accelerating deployment of these spills management initiatives needs to be established and sustained. Spills management, overall, has the potential to add considerably to the margin of safety of the Titan 2 system in the years to come.

In the vein of containing accidents, certain salutary modifications have been or already are being made. For example, the antenna system for the radio-type maintenance net (RTMN) has been replaced with one which substantially reduces "dead spots" in the silo and improves the quality of communication. Further improvement is still necessary. The RTMN is important not only to the day-to-day interface between and among operations and maintenance, but also as the primary means of communication during emergencies and the only means of voice communications during propellant operations requiring use of the rocket fuel handlers clothing outfit (RFHCO).

Also related to accident containment, as well as day-to-day operations, are clothing and equipment to protect those who must work in a hazardous environment. The Biopak 45 is a new, modern, self-contained breathing apparatus to replace the less satisfactory Chemox units. Fielding has been delayed until certification, required after installation of communication devices, is complete. Still needed in this area, and presently under study, are a new fixed vapor detection system in the silo to meet current Air Force Occupational Safety and Health (AFOSH) and proposed National Institute of Occupational Safety and Health (NIOSH) standards, a new portable vapor detector to do the same, and more sustainable rocket fuel handlers clothing outfits (RFHCO) that offer improved protection against toxic environments. Perhaps an even more compelling reason for replacing these three, however, is the need to provide a more reliable means of meeting even the standards for which the equipment was originally designed. This concern is referred to as currency, rather than design, incorporating the need to repair, then eventually replace, equipment whose adequacy has been compromised by the aging process.

CURRENCY

Design safety and system currency are closely related. While the Titan 2 and its support equipment are continually updated to meet current, often more stringent standards, existing equipment also is reviewed to ensure that aging has not caused it to fall below current standards. And work continues to provide assurances that it will be possible to support the Titan 2 system as it ages, repairing or replacing worn parts or subsystems with items of at least equivalent quality. This is the essence of currency.

Warhead.—In pursuit of currency, the limited life component (LLC) program replaces warhead components before the age-out cycle is complete. The review group recommends that the exchange cycles of these components be aligned with other service-life limited components in the reentry vehicle, so that associated potentially hazardous operations might be accomplished less frequently. There is also a random selection program to withdraw and evaluate weapons from the field to ensure that aging is not proceeding faster than expected. If a particular component is shown to be degraded, a program will be established to assure that it is repaired or replaced in a timely manner. Finally, there is a very active materiel deficiency reporting system which identifies to the depot all problems encountered with the warhead, reentry vehicle and support equipment for correction, possible fleet-wide alerting, and future preventive action.

This process applies to warhead and associated reentry vehicle (RV) handling equipment as well. While the replacement of the RV transporter and Coles crane with new models was partly motivated by safety of design, the aging of these components also was a factor. Aging appears to be the primary factor in the failure rate now being experienced by components in the RV sling used in RV mating and demating operations. While these failures have not placed the warhead in danger of becoming involved in an accident that would pose a hazard to the public, the group recommends that the sling be analyzed further and that parts be replaced. The stringent standards employed in these reviews are the same as those used in the design process. As safety is first priority for design, so safety reviews are first priority for currency.

Missile.—The currency program for the missile system is also extensive. The scheduled maintenance program for the Titan 2 missile requires SAC technicians to perform a corrosion damage and leakage inspection of the airframe on a regular basis. Portable vapor detectors (PVDs), capable of measuring parts of propellant per million parts of air, are used periodically to check for any propellant leakage. The Titan 2 support depot is experimenting with an acoustic method to anticipate possible cracks or leaks in the missile airframe. Anomalous conditions and the corrective actions are tracked and analyzed by SAC, depot engineers, and systems specialists. The reliability and aging surveillance program (RASP) provides a structural assessment of a random sample of Titan 2 airframes each year. The RASP program includes visual, X-ray, and dye penetration inspection of all external and internal welds and structural members, with particular emphasis on high stress areas. Deficiencies are repaired by a special depot team. Analysis of RASP findings over the past 10 years reflects no increase in the frequency of structural defects.

The service life analysis program (SLAP) encompasses the engineering evaluations, hot fire static tests, and analyses required to detect service life limiting conditions of the rocket engine and its components. All applicable aging and surveillance data are compiled, analyzed, and maintained in SLAP files. Service life degradation trends are identified and evaluated for effects which could impact readiness or safety. Corrective actions are determined and appropriate action is taken to maintain operational integrity and viability.

Most missile support equipment also is carefully examined. Fixed equipment is examined in-silo; mobile equipment is inspected on base. That which shows signs of wear in critical areas is repaired or replaced. That which has critical deficiencies, as a result of design, manufacturing, or normal wear and tear is subject to reporting under the material deficiency reporting (MDR) system which alerts the rest of the operational wings, SAC, and the depot to the problem. While the review group recognizes some problems with this system and recommends that all MDRs and MDR status reports be sent through the depot system manager to improve responsiveness, MDRs still have a considerably beneficial effect. Depot will investigate the problem identified by the MDR and determine if it may be fleet-wide. In any event, the problem will be fixed; if it is fleet-wide. it will result either in a fleet-wide repair. possibly at the depot, or in a fleet-wide replacement with a thoroughly tested substitute.

A particular problem with Titan is the fact that real property installed equipment (RPIE), e.g., plumbing, air conditioning, etc., does not receive this same treatment. While it is inspected and MDRs are submitted, it is not included within a formalized reliability and aging surveillance program. So far, these systems have not been sufficiently degraded to seriously impact the weapon system, but the group recommends that a system be developed for RPIE similar to that for other elements of the Titan system. Another problem with Titan, as with all older systems, is the difficulty of keeping special levels of seldom-used but much needed parts, when these parts are no longer available from the original manufacturer. This is an especially difficult problem for larger subassemblies for which repair is no longer feasible, and the original manufacturer is no longer in business. An updated, often improved product normally will be selected as the replacement in such cases, but with attendant delays in acquiring the new item. Titan shares with all other systems delays in the modification or replacement development and deployment process. This area should be reviewed for possible improvement.

While there are problems with the system, rigorous inspections and evaluations have produced corrective modifications which, along with regular maintenance, have kept missile hardware in good condition. An example of these modifications is a new guidance system which represents a significant improvement over its predecessor. Another such modification is the mobile propellant transfer system (PTS) update which was undertaken due to aging of PTS trailers and associated systems. A safety concern arose due to excesive minor failures which could have resulted in minor leaks and personnel exposures.

Another important modification, still under way is the replacement of propellant system seals on the missile with a new type that is extremely resistant to the corosive effects of the oxidizer. These elastomer seals have considerably reduced minor leaks and should extend the cycle for required propellant down and up loads necessary to fix such leaks. That, in turn, will reduce the exposure of the missile and reentry vehicle to the type of activity that provides the greatest possibility of an accident. Other modifications were similarly gererated and motivated. These include the combined system test set, improved ordnance electrical wiring and improvements to the oxidizer burner propane trailer. Several other such modifications are either under way or in the planning and budgeting process.

The review group proposes additional emphasis on certain of these planned programs and modifications or additions to that list. Included are those mentioned earlier, beginning with the in-silo fixed vapor detection system. Of greater immediate concerns than its failure to meet current AFOSH and proposed NIOSH standards in terms of detection ability is its excessive downtime, eliminating the best current system to detect propellant leaks in the launch duct. The fixed system is currently out of commission some 40% of the time. The magnitude of this deficiency is reduced somewhat by the fact that technical data procedures require the fixed vapor detection system to be operating before missile propellant transfers can be conducted.

Also, most accidents involving the missile would occur when maintenance is being performed in the launch duct. When the fixed system is inoperative, a portable vapor detector (PVD) is required to be present and operating properly during all activities in the launch duct. And there are work-around actions that can be taken. They include procedures to watch other, albeit less satisfactory, indicators more carefully, to visit and sample the launch duct more often with a PVD, to visit and sample the launch duct more often with a PVD, and to remote a portable vapor detector or similar item from the launch duct or exhaust shaft to the launch control center (LCC). They also include substitution of usable parts from other sites to ensure that the fixed system is fully operational on encroached sites. But there is a need for a long-term solution. The present fixed system will not be supportable beyond 1983; if a system that will detect levels as specified in proposed safety and health standards cannot be made available by then, an interim, reliable and supportable system needs to be procured and installed, with attendant technical data and training in its use.

The portable vapor detector (PVD) was mentioned as a possible part of the near-term workaround. The PVD has its own problems, brought on with age. False indications of vapors and supportability have become problems with this key item. It needs to be replaced soon with a more reliable system. A new PVD prototype is scheduled for deployment in August, 1981. This important program must not be allowed to slip. Also, an additional, more capable, system is needed for bioenvironmental engineers to do diagnostic work in post-accident environments.

Finally, the RFHCO protective clothing worn by those who must work directly with the propellants, and required for many accident recovery operations, is beginning to wear out. A new and improved design is being studied which will enhance the protection afforded the wearer. But the need for more suits in good repair is immediate. New zippers have been purchased. Action has been taken to return reparable suits to the units and to purchase additional suits of the old type to prevent future shortages. The momentum of both the near-term and long-range solutions needs to be maintained. Funding will be a key to maintaining that momentum, as it will with all the other modifications endorsed or proposed in this report.

As a related matter, service engineering funds are used to provide for initial evaluation of hardware anomalies, conduct engineering studies, and perform logistics assessment analyses for the Titan system. Most Titan modifications are developed through service engineering contracts. Yet, several important projects have been deferred and others are to be deferred in Fiscal 1981 because of service engineering funding shortfalls. The group recommends supplemental funding be provided for service engineering in Fiscal 1981 and that subsequent annual service engineering requirements identified by depot be adequately funded.

OPERATIONS

Warhead, missile, and support hardware which meets stringent specifications and which is kept in good condition is not enough to guarantee safety. Those who work with the system daily are an essential part of the safety equation. The missile crews have the technical knowledge and training to ensure the safe, effective operation of the system. Their checklists are explicit, exacting, repeatedly exercised and continuously evaluated. Moreover, safety is paramount in every procedure and situation. As is stated in their governing directive: "Adherence to safe operating procedures and nuclear weapon system safety rules is mandatory and will be given prime consideration in the planning, scheduling, briefing, and conduct of all missile combat crew activities."

The crews are carefully selected to meet explicit standards, including emotional stability, security clearance eligibility and physical criteria. The continuing ability to meet these standards is monitored and managed under the personnel reliability program. While the crew force has become younger, it is no less reliable. Its proficiency relies on a comprehensive training program.

Formal training is provided by both Air Training Command (ATC) and SAC. ATC trains in the functions of the missile and support equipment and the theory of operation. Then SAC trains have to operate the missile support and individual safety equipment, as well as the coordination required by a missile crew. Extensive training is given on performing the many operations and emergency checklists. Procedures are practiced again and again to assure the crew's ability to react to any situation. Unit upgrade checkout programs involve weeks of procedures training, simulator "rides," and intensive evaluations of new missile crew members until the standardization criteria are met and they are declared mission ready. Only then is one eligible for crew duty.

Crew evaluation is thorough and continuing. Standardization crews conduct initial crew evaluations and as a minimum, annual reviews. The 3901st Strategic Missile Evaluation Sqn., a headquarters SAC unit, randomly evaluates selected crews on weapon system knowledge, safety and emergency war order procedures. Additionally, the SAC inspector general conducts no-notice operations inspections of the crews in the missile procedures trainer (MPT) and in an operational control center. The results of these inspections/evaluations are reviewed and any significant crew deficiencies are trained out immediately, while adverse trend information is fed back into a continuing training program for its enrichment.

This group notes the need for an improved missile procedures trainer (MPT) for each Titan 2 wing. The current MPT is capable of providing training and evaluation of only 30 percent of the possible malfunctions a crew could encounter and procedures they are expected to be able to perform. Although the remaining 70 percent is being accommodated by less desirable training methods, a state-of-the-art MPT is needed to provide more realistic hands-on training. Expansion into multiple hazard training, also called for in this report, can be handled on current trainers, although it could be more effectively accomplished on an improved model.

The crew procedures are the result of years of development and refinement. Each is thoroughly evaluated and, when employed as a checklist, requires demand-response performance. Thus, safety and procedural control is imbedded in every action. The review group recommends that certain emergency procedures be elaborated in the form of refined evacuation data bases and decision matrices and consolidated spill mitigation/recovery data bases and martices. These would assist the crew and every level in the missile potential hazard team (MPHT) with whom the crew interfaces in coordinating actions in the event of an accident. But such data bases and decisions matrices are not absolutely essential to proper and expeditious accident responses. Their importance will be assessed in context in the crisis management section below.

Those procedures currently available to the crew are augmented by an elaborate safety system that includes hazard sensing and warning equipment, safety equipment, protective clothing and equipment, and explicit safety requirements. Improvements that this group recommends in hazard sensing and warning and crew protection have been discussed earlier under design and currency. Perhaps the most important of these from an operational point of view is providing a means to ensure that the crew will be able to safely remain in the capsule in the event of a major propellant spill, to allow continued interface with maintenance team members and the MPHT. While the crews are presently quite capable of obtaining indicators of problems and protecting themselves in a wide range of scenarios, the proposals cited would provide an additional margin of safety.

Overall, the missile crews are knowledgeable, well-trained, and are capable of operating the system safely and effectively. Improvements can be made at the margin in procedures and hardware to assist the crews in preventing and containing accidents, but fundamental safety is apparent.

The maintenance team within the Titan 2 system is fully capable of ensuring a viable weapon system. The personnel who maintain the system are trained professionals who have the technical knowledge and mechanical skills to properly service and maintain the system. The hardware, maintenance procedures and policies are considered adequate to provide required system support safely and effectively. In addition, the technical orders are comprehensive and sufficiently complete to support and maintain the weapon system.

The technicians who maintain the Titan 2 system are selected on specific aptitude levels, emotional stability, color vision, security clearance eligibility, and a special physical profile factor. The entrance requirements have remained the same for years. At the same time, the age and experience of technicians today do not favorably compare to those of several years ago. While this is a problem endemic to all Air Force career fields, it could affect future Titan 2 supportability. Currently, training fills in somewhat where experience is lacking, upgrade to higher skill levels continues on track, and evaluation programs indicate that acceptable work is being done. Strong leadership must be exerted, however, to insure that maintenance personnel continue to approach their work with an attitude that is disciplined and professional.

Of considerable concern is the shortage of technicians in certain selected career fields, notably propellant transfer specialists (PTS) and nuclear weapons specialists. This leads to a related concern—a shortage of middle-level supervisors. Retention is the key to the problem, and a level two selective reenlistment bonus (SRB) for all Titan maintenance specialties and special pay for hazardous duty (SPHD) for PTS technicians may be the answer. The review group highly recommends these actions. In the munitions area, the key instead may be a special experience identifier (SEI), to let the personnel system know that a munitions technician or supervisor has Titan background, so that he or she might be brought back after a tour elsewhere in the broad munitions field. The group recommends that such an SEI be established.

In the maintenance environment, training plays a particularly important role. Technical training is conducted by Air Training Command (ATC) using curricula which are updated based on annual ATC course reviews, equipment modification meetings and, to a lesser extent, SAC/ATC Titan 2 training conferences and training feedback programs. Unit training follows at each Titan 2 wing with specific job qualification training, upgrade and recurring training, and management and special technician training.

The review group recognizes a need to improve training at both the ATC and unit levels, centering on the need for unit trainers for the PTS technicians and refurbishment of Sheppard Technical Training Center trainers. A PTS trainer at ATC is nearing completion and a statement of operational need (SON) is being initiated to develop unit level PTS trainers: their expeditious completion and use is supported by this report. PTS is a particularly difficult area to train realistically; good trainers can considerably improve the quality of initial and recurring training.

The group also recognizes the beneficial impact of the recent institution of the centralized training branch (CTB) in Titan units. This organizational modification creates an atmosphere that emphasizes the learning experience over getting the job done and getting home. Those who have experienced it on both sides, trainer and trainee, are virtually unanimous in their assessment of the beneficial effects of this approach.

Even with task-certified technicians, some tasks receive special safety emphasis. Quality Control (QC) inspectors monitor and evaluate a large portion of these actions. For example, 75 percent of the liquid propellant flow operations are inspected, and in the case of the more critical fill and drain disconnects from a loaded missile tank, QC inspectors are on the scene 100 percent of the time. This, of course, requires the QC inspector to wear the Rocket Fuel Handlers Clothing Outfit (RFHCO) and join technicians on the scene in the launch duct. All technicians are initially and then periodically evaluated by QC on each task they are certified to perform. Additionally, like the operations crews, they are subject to evaluation by the 3901st

SMES and SAC IG. A senior wing staff member, the Wing Deputy Commander for Maintenance, reviews each unqualified grade with the technician, his supervisor, trainers, evaluators, and if the area was safety related, wing safety. Lessons learned are fed back into shop briefings, initial and recurring training, the evaluation program, and proposals to change procedures and equipment. At least quarterly, the wing commander or vice commander reviews evaluation trends and analyses to identify emerging problem areas and determine corrective actions.

Hardware, procedures and maintenance policies for the system appear to be largely in good condition, and are capable of providing the required system support. In addition, the hardware, procedures and policies are under continuing review for upgrade. Technicians at all levels report deficiencies they encounter. Some of the deficiencies and consequent recommendations referenced earlier in the design and currency sections surfaced in this way.

The technical order system is used to disseminate information, instructions, and safety procedures. Criteria and procedures to ensure that they are current, comprehensive and complete were implemented prior to the inception of Titan. Still, this group found that they are not republished as frequently as they might be, and could in some cases be fruitfully reorganized.

For all technical orders, changes pile up in the books, forcing the technician to refer to the changes frequently in the course of a task. In some technical orders, the basic organization also drives the technician to continually cross-reference. To the extent possible, this needs to be remedied. It generates a greater possibility of losing track of key steps, and thus increases, however slightly, the possibility of an accident.

The review group recognizes and emphasizes the continuing need for strong leadership and discipline to enforce strict compliance with technical orders. Overall, despite these problems, the review group assesses that maintenance technicians, procedures and equipment appear capable of maintaining the Titan 2 weapon safely. The overall record of maintainers in preventing accidents has been good but could be improved. Steps are being taken to improve it; relevant initiatives have been discussed above. The overall record of maintenance personnel in containing and recovering from accidents and assisting in public protection demonstrates their courage and inventiveness, and indicates that they are well-prepared to assist in resolving hazardous situations.

ACCIDENT PREVENTION

A review of the safety record of the Titan 2 weapon system reveals that, overall, it has been a safe weapon system. A comparison of the Titan 2 safety record with like options of the private sector containing similar hazard potential depicts Titan 2's record as favorable. There has been only one missile accident in the field in the 18 years that Titan 2 has been deployed that has resulted in any injury to the public. A few others have involved casualties among those directly involved with the system, but procedures and hardware, inplace or being planned, would have prevented many of these accidents, and averted most of the resultant casualties.

The safety designed into the Titan 2 weapon system, its modifications, and the continuing efforts to keep the system current and in good physical condition, are reflected by the low number of major mishaps caused by materiel failure. Over the life of the system, there have been seven major mishaps attributable to materiel failure, and of these, only one occurred at an operational unit. The remainder occurred during either preparations for or during flights at the Vandenberg AFB, Calif., test facility.

In working to make the system safer, for the public and for the crew member and technician, each accident is closely examined to determine its cause in order to prevent similar accidents from occurring in the future. Two independent review boards are formed in the wake of each major accident to look for causes and make recommendations, recommendations which get priority attention throughout the system. Such boards were formed after the 1978 spill at Rock, Kan.—resulting in new procedures to prevent and contain oxidizer spills in the silo. As stated earlier, many hardware initiatives were also begun there, many of which have been or are about to be deployed in the field. This review group recommends accelerated completion of the development and deployment of these spills management initiatives. The 1980 fuel leak and resultant explosion at Damascus have already led to the tethering of tools, planned deployment of catch nets, lowering of additional work platforms, raising of protective flaps, and possible additional procedural and hardware changes.

Of concern is the number of mishaps, mostly minor but including the major mishaps at Rock, Kan., and Damascus, Ark., which resulted from personnel error. Since

1976, mishaps caused by personnel error have shown a sharp rise. This adverse trend must be reversed. Strong leadership is required to promote discipline in the use of technical order procedures and to foster an acceptance of responsibility by each technician for the quality of his/her work.

It is recognized that prevention of accidents may not always be possible. Even in a demand-response environment, with good leadership and discipline, using check and double-check procedures, mishaps can and sometimes do occur. In those infrequent circumstances, an additional margin of safety is required, a capability to mitigate, contain, and resolve the situation, while minimizing undesirable consequences to the public and preventing casualties to those nearby.

CRISIS MANAGEMENT

The system to minimize these consequences can be described as crisis management. An assessment of Titan 2 crisis management capabilities requires identification of the full range of plausible accident scenarios, establishment of the tasks necessary to successfully deal with such scenarios, and a critical evaluation of the capability of the system to execute the required tasks. In this report, the group excluded from consideration those routine, minor mishaps which present no threat to the public, and those worst conceivable cases that are so improbable their likelihood is virtually zero. What remains is a set of plausible warhead and propellant accident scenarios that provide the basis for assessing adequacy and ensuring an appropriate margin of safety.

In the context of plausible and stressful accident scenarios, successful crisis management consists of an appropriate combination of assured indication and proper diagnosis of a problem, notification of relevant agencies, immediate damage limitation actions, public warning, evacuation and support, containment and resolution of the hazardous situation, and restoration of the affected area so that the evacuees can safely return and resume normal activities. A continual, frank, and constructive interface with state and local officials, the news media, and the public must occur throughout.

Not all of the tasks need be carried out in every accident, depending on the nature and seriousness of the hazard posed. And even in serious accidents, an ability to immediately limit damage well may compensate for shortcomings in warning and evacuation, or, less desirably, an ability to warn and evacuate expeditiously and effectively may compensate for shortcomings in immediate damage limitation. In either event, clearly a key task is indication; without it, strength in either immediate damage limitation or warning and evacuation may be for naught in a major accident. To a greater or lesser degree, depending on the accident, the key tasks of indicator diagnosis, damage limitation, warning and evacuation need to play together to assure successful crisis management for a broad range of plausible hazard scenarios on-base, during movement to and between sites, on-site topside, and in the silo.

Numerous safeguards have been implemented to anticipate and deal with potential mishaps. Both the warhead and the propellants are monitored continually and handled only by fully certified technicians. Handling procedures are carefully designed and managed to anticipate possible problems, and to have proper response capabilities at the ready—just in case. On base, infrequent and limited exposures clearly minimize potential hazards. Nevertheless, procedures are conservative, and the technicians are carefully trained, certified and supervised. On the road and at the missile complex, the hazards become greater, and the consequent precautions proliferate—reaching their peak during RV removals and replacements and PTS uploads or downloads when the member or on-site technicians and supervisors and on-base monitors is at a maximum.

Additionally, Titan 2 bases, Numbered Air Force (NAF), Headquarters SAC, and various technical supporting agencies continually prepare for the possibility that crisis management procedures may be required. Base disaster and public affairs programs provide response plans that are coordinated with higher headquarters and increasingly with state and local governments. These plans are being improved and refined. Key preparations at many levels are exercised regularly; integrated, realistic, multilevel, joint exercises are recommended. When problems are noted, corrective actions are taken to strengthen the overall system.

For the least likely, most stressful of plausible scenarios, certain near-term and projected initiatives to be discussed below, will provide an additional margin of safety. Many of these were discussed earlier in the report under design, currency, operations, and maintenance. These will be summarized briefly. Where new areas are introduced, the treatment is expanded here.

Indication of emergencies would be enhanced by interim and follow-on improvements to the portable and fixed vapor detection systems, and remoting certain indicators to the capsule. Notification within the Air Force is deemed to be satisfactory, and no significant improvements are assessed as being available at the margin. Diagnosis and direction would be reinforced by a new RTMN, consolidated spills management and revised evacuation data bases and matrices, and actions to better secure the control center and minimize the possibility of crew evacuation. Other items under diagnosis and direction include improvements to MPHT organization and equipment, a secure voice capability for the ready-to-field Inter-base Radio Net, clarification of on-base and on-scene commander and adviser roles, and joint, realistic exercises.

The group recommends that these exercises be made more realistic by injecting more stressful public affairs inputs, conducting certain exercises off-base, on the road or at actual missile sites, to include stressful propellant and warhead related scenarios, and integrating state and local officials into such exercises. The latter will first require completion of ongoing Titan base-state and base-local agreements and derivative planning with state and local officials. This should be done in conjunction with the establishment of agreed planning criteria arrived at with the help of the Federal Emergency Management Agency (FEMA).

While the base-level team to be exercised is reasonably well-structured and well-prepared today, there needs to be clarification of the role of the wing commander in the field. In the command post, the wing commander can be bogged down with inputs and demands from every quarter. Clear procedures, agreed to at every level, need to be established to allow commanders to use their senior staff to interface with the on-scene commander, with public and press, and with higher headquarters, except for key communications with each of these agencies. This will allow them to step back, overview the total situation, consider the options, and reach well-conceived decisions.

In the field, particularly at the two bases where the Titan wing is a tenant organization, the relationship between the initial response force on-scene commander and the Titan wing commander's on-scene representative needs to be clarified. The situation is complicated further in serious accidents that generate the dispatch of a SAC follow-on response force, led by a general officer. Then the relationship becomes triangular. Draft Defense Nuclear Agency (DNA) doctine would indicate that the general officer should stand above and possibly relieve both the initial on-scene commander and the wing maintenance representative, expanding the team and orchestrating all activity on and off the site. Exercises and actual events would indicate that this doctrine needs to be clarified and possibly modified based on experiences to date. Further exercises may be a vehicle for testing, and eventually disseminating and including doctrine once that clarification takes place.

Such exercises need to integrate more realistically higher headquarters, involving the members of the Missile Potential Hazard Team (MPHT). The MPHT is a group of operations, maintenance and crisis management technical experts from every portion of the Titan 2 system—key representatives from various parts of the wings, Numbered Air Force and SAC Headquarters, Ogden Air Logistics Center, and appropriate civilian contractors. These experts are interconnected in real-time, primarily by the SAC Telephone Network (STN). They are brought together in conference to assure that the best technical advice is available to determine the most prudent approach to containing, then resolving a situation where an accident is imminent or has occurred.

While the review group recommends a number of initiatives to improve the responsiveness and effectiveness of the MPHT, the basic concept is sound. Properly implemented, in a potentially hazardous situation it can provide those on the scene with the ability to take standard actions covered in technical data and urgent actions immediately required to contain a situation prior to MPHT formation. Non-time urgent, non-standard actions with potentially serious consequences can be deferred for deliberations by technical experts from across the array of organizations with expertise in Titan. The unit decides if and when to form its own MPHT, and then whether to request connection to outside expertise. It can informally go to depot, while formally escalating to its Numbered Air Force, SAC headquarters, the depot, laboratories and contractors in turn, as the consensus of those already on the net indicates the additional input is needed. The wing remains the focal point for proposing and executing actions, but decisions necessarily are by consensus. While the unit has available to it considerable day-to-day technical expertise to include quality control, technical engineering, and a contractor representative, the full array of expertise available to it through the MPHT cannot be duplicated at every wing.

To improve MPHT implementation, in addition to realistic exercises, a consolidated data base and associated decision matrix is needed for immediate mitigation, containment, and resolution of propellant spills on base, on the road, topside, and in the silo. It should be updated as new hardware and procedures become available in the field. This would go hand-in-hand with a refined data base and associated decision matrix indicating whether evacuation would be required, who should leave and where they should go.

While such evacuation data bases and decision matrices currently exist, ongoing efforts, including this review, would indicate revision is required. Such revised data bases and decision matrices would have all MPHT members using the same guidance at the outset, and facilitate well-conceived, well-concerted action on a more timely basis than present procedures might permit.

Also needed for the MPHT are improvements in the area of its membership. For example, the 3901st Strategic Missile Evaluation Sqn.—an organization with an impressive array of system knowledge, talent and experience—has been omitted in past accidents. 3901st representation is highly recommended. Occasionally, other expertise should be solicited as well—organizations such as Air Force Rocket Propulsion Laboratory, Sandia National Laboratories, Los Alamos National Scientific Laboratory, Lawrence Livermore National Laboratory, Environmental Protection Agency, Dept. of Transportation, etc.

SAC or the depot should maintain an inventory of such agencies with their relevant expertise and a list of contact points to be available on a 24-hr. basis if possible. To assure that the key contractor is available on this basis in the future, the review group recommends consideration of a contract with the Martin-Marietta Corp. Reorganization of the MPHT requires consideration. There are so many members of operational necessity that net management capabilities and procedures are easily and frequently overwhelmed. The group suggests that a multi-tiered system might provide the required access and information transfer in a more manageable and reliable net. For example, specifically recommended is a net for technical experts, to develop alternatives, linked with a net for managers, to deliberate on the alternatives and decide on an approach to resolving the problem. Such a system would also assist in net discipline, a continuing problem in past accidents. In any system, net discipline needs to be improved through continuous operator training, given their turnover, and user training over and above the recommended recurring exercises.

Net effectiveness also can be enhanced by improved hardware. Either a new, MPHT-dedicated system should be procured, or leased lines should be added the SAC telephone network (STN) presently used by the MPHT. These should improve communications quality and reduce the probability of preemption of MPHT members on the net. As specified in present directives, no non-push-to-talk telephones or two-way speaker phones should be used by MPHT members. Proper instruments should be funded where MPHT members may not now have access to them, and Inspector General attention should be directed to enforcing compliance in this area.

Immediate damage limitation and eventual problem containment and resolution would be bolstered by fan and water spray overrides, and a variety of spills management hardware and associated procedures. Improved portable detection gear and protective clothing also are supported. Public warning and evacuation would benefit from reinforcement of the propellant convoy discussed below, and the establishment of joint planning criteria based on the aforementioned evacuation data base and decision matrix.

In the context of such criteria, joint Air Force/state and local warning and evacuation planning needs to be done in the near-term, on a site-by-site basis. That planning would be the basis for joint selection and deployment of an effective immediate warning system, probably a high-decibel siren, integrated with systems to warn those beyond the reach of the sirens and to inform all potential evacuees of the preferred routes and the final destination.

Joint site-by-site planning also needs to be completed concerning possible Air Force support in providing transportation to those who need it to evacuate, relocation centers for those who do evacuate, and help for those who may need to have actions taken regarding the area that has been evacuated. These plans need to be incorporated into community education programs to familiarize the public with missile safety, hazards, and evacuation procedures.

All of these joint actions—especially those affecting immediate warning and assured evacuation—are important particularly for the most heavily encroached sites, notably 571-7, 570-9, and 571-5 at Davis-Monthan, and 532-9 at McConnell. Expedited action should be accomplished at 571-7 on a prototype exhaust shaft oxidizer burner or scrubber, and on an effective immediate warning and evacuation scheme.

If this is not practicable, this site should be considered for conversion to training status, retaining the possibility of its return to alert at higher Defense Conditions (DEFCONS).

Further encroachment should be strongly discouraged to prevent real estate development from creating situations at other sites similar to the one that exists around 571-1, where 1,000 households are estimated to exist within 1 mi. and many times this number are estimated to exist within 5 mi. This particularly applies to the first mile, within which large numbers of high-density dwellings would make time/distance evacuation requirements difficult to meet in a major uncontained propellant spill. However unlikely such an occurrence may be, we need to be able to deal with it should it occur. The case for discouragement could be centered around a missile compatible use zone (MICUZ) concept, now under study at the Air Force Engineering and Services Center (AFESC). The concept needs to be refined and worked closely with local officials and planning and zoning boards for implementation.

There is a need to reinforce propellant convoys, to conduct them in a manner similar to RV convoys in order to better anticipate and be able to react in case of an onroad accident. The review group recommends that local authorities be prenotified; a route identified and followed which avoids populated areas to the extent possible; a helicopter equipped with a loud-hailer type loudspeaker fly overhead; and evacuation notification team (ENT) go along; and convoy location be carefully tracked along the way. The tracking would be done by a propellant transfer evacuation and safety team (PTEST), formed in the wing command post in the manner described in SACR 355-5 for onsite PTS operations. If a mobile immediate warning system (probably a truck-mounted high-decibel siren) were developed and procured, it might accompany the convoy.

Finally, there is a need to improve communication with the public in any future accidents. This thread emerges from past excercises and actual crises such as Damascus. Four lessons are clear. First, there is a need to ensure that expeditious, authoritative statements concerning any accident flow from responsible local Air Force spokespersons to state and local officials, the news media and the public (especially those potentially or actually affected by evacuation).

Second, these public statements rapidly should confirm the presence or absence of nuclear weapons in the accident, and frankly discuss safety features and potential hazards that flow from the accident. This clearly is within the limits of current policy—policy that this group believes should be strengthened. That strengthening already is under way.

Third, procedures should be refined to provide timely notification and an ongoing flow of information to interested members of Congress and their staffs and other federal agencies such as DOE and FEMA. And fourth, interagency agreements should be established to coordinate government-wide public affairs responsibilities, procedures and activities in nuclear accident situations.

In most cases, the successful accomplishment of these communication responsibilities during an emergency will require rapid reinforcement of local public affairs resources from higher headquarters. Procedures will be improved further by forming a rapid-reaction Community Action Team, to provide a more timely and comprehensive interface with adversely affected communities. To provide an in-place capability during the critical early hours of an emergency and to strengthen civil relationship in an ongoing way, the group recommends that local public affairs resources be augmented by the creation of an officer and an enlisted public affairs position in each of the two tenant Titan wing staffs. These positions should be manned on a priority basis. Despite the proposed improvements, the group judges that the Titan 2 crisis management system is able today to successfully manage a full range of plausible accidents in the unlikely event one should occur. The improvements proposed would add to the robustness of that already exists. The combined efforts of Air Force, other federal agencies, and state and local officials can successfully minimize undesirable consequences to the public and prevent casualties among those whose only involvement with the system may have been their proximity to a mishap site.

MANAGEMENT

At the outset of this overview, the important role of strong management which stresses and assesses safety and makes modifications to enhance it at was noted. That thread ran throughout each of the functions discussed. We saw it in design, in the way the system scrutinizes hardware and modifications to ensure that they meet high standards. We saw it in currency, in the way the system ensures that hardware aging problems are uncovered and corrected before they become serious, and the supportability of the system is sustained. We saw it in operations and maintenance, in the way that the system ensures that well-screened, well-trained people work on the warhead and missile hardware, with proper procedures and equipment available to them. We saw it in the way that lessons were learned from accidents, to improve the ability of design, currency, operations, and maintenance to prevent and contain serious mishaps. And we saw how the crisis management system continues to be refined, to ensure that all relevant resources. Air Force, other federal agencies, state, and local, are kept ready to respond to protect the public should an accident occur. The review group suggests that nearly all the deficencies and problem areas identified elsewhere in the report can be resolved in a timely manner if they receive continued management emphasis and funding priority.

OVERALL ASSESSMENT

The Titan II weapons system represents a capable and important instrument of U.S. national policy. Commensurately, it imposes a compelling responsibility for safety. Consequently, safety has been a pervasive and paramount consideration in every stage of the Titan 2 life cycle.

The basic design was and is safe. System currency is being maintained adequately. Operations and maintenance procedures are adequate to ensure safety and supportability. In these areas, the group concurs with the Assessment Report on Titan 2 weapon condition and safety provided to the Congress in early 1980. That report is valid, and we agree with the great majority of its findings, although its assessment is incomplete. We have attempted to review a wider array of factors here. Collectively, these factors represent a considerable capability to prevent accidents. In addition, a comprehensive crisis management capability provides an extra margin of safety—just in case. Thus, the Titan as a weapon system is assessed as safe and supportable.

RECOMMENDATIONS

As with any technologically complex system, military or civilian, improvements can be suggested.

The most significant recommendations of this study are summarized below. The attached appendices provide more detailed discussion and additional recommendations. These initiatives are intended to maintain the supportability of the system and to provide an extra margin of safety now and in the future. They are intended to reduce further the probability that mishaps, especially serious accidents, will occur; and that should they occur, to further increase the probability that they will be responded to in a manner that provides for public safety. (Those recommendations marked with an asterisk should he adopted at the most encroached sites first.)

1. Recognizing the important role of personnel in complementing hardware and procedural improvements, reemphasize the key role of leadership and acceptance of responsibilty, together with technical order discipline, at every level in operating and maintaining the system.

2. Improve maintenance personnel retention.

a. Establish Level 2 SLRB for all Titan 2 maintenance technicians. Waive the bonus level determination rules.

b. Secure Special Pay for Hazardous Duty for Titan 2 Propellant Transfer Specialist technicans.

3. Improve the ability of the missile crew to detect, mitigate and control potential mishaps.

a. Remote various sensor readouts (i.e., launch duct temperature, vapor detector annunciator panel, etc.) into the LCC.

b. Ensure that the crew can safely remain in the LCC in the event of major propellant mishaps.

c. Provide the capability to manually override automatic controls (i.e., purge fan, launch duct sprays, etc.) together with the ability to regenerate vapor and fire suppression water with a recirculation or a more rapid renewal system.

d. Develop a remote (or automatic) tank venting capability for crew use at MPHT direction.

4. Mitigate the effects of the often inoperative current fixed vapor detector system.

a. Expedite procurement of a state-of-the-art fixed vapor detector system until the final design (meets all standards) can be deployed.

b. In the interim, remote a portable vapor detector or similar item from the silo or exhaust shaft to the launch control center (LCC).

c. Cannibalize as necessary to keep fixed vapor detector systems operational at the most encroached sites.

5. Improve spills management procedures.

a. Develop a consolidated spills management data base/decision matrix.

b. Expedite the development of hardware and procedures to scrub/burn/suppress/neutralize/remove major in-silo propellant spills and resultant vapors. Procure an interim prototype burner for the most encroached site, 571-7, in the near term.

c. Also develop procedures and equipment to contain/supress/neutralize/remove on-road and topside propellant spills and resultant vapors.

d. Conduct realistic exercises with rigorous accident scenarios to strengthen base- and higher headquarters-level MPHT and Disaster Control Group capabilities to deal with various accident scenarios.

6. Improve ability to react to an accident to protect and inform the public.

a. Review, refine, and republish data base, decision matrix, and SAC Regulation 355-5 on procedures for warning and evacuation for warhead and propellant hazards on base, on the road, topside and in the silo.

b. Develop and test in combined exercises, joint Air Force, state, and local warning and evacuation criteria and plans tailored to both propellant convoys and individual missile complexes.

c. Select and deploy an immediate warning system (probably a siren) for missile complexes and propellant convoys. Place such a system at the most encroached site, 571-7, in the near term. Integrate this system with joint propellant convoy and missile complex warning and evacuation schemes. These schemes should include the means to provide evacuees with routing and relocation destination information.

d. Reinforce propellant convoys to be able to better react to an on-road accident, including helicopters with loud-hailer type loudspeaker overhead, and evacuation notification team (ENT), immediate warning system (siren on truck), and spill suppression and neutralization equipment.

e. Permit local Air Force officials to communicate with the public responsively and candidly in accidents. Provide them rapid clearance to confirm or deny the presence of nuclear weapons and to discuss hazards and safeguards.

f. Refine and implement the missile compatible use zone (MICUZ) concept to discourage further encroachment of Titan 2 missile complexes. In the meantime, act to discourage encroachments by high density developments within 1 mi. of missile sites.

7. Ensure that priority attention and funding continue to be devoted to expedite important ongoing improvement programs such as RTMN upgrade, RFHCO, portable vapor detector, interbase radio system, operations crew missile procedures trainer, unit level PTS trainers, and installation of quick disconnect filter screens.

8. Ensure future supportability.

a. Adequately fund service engineering requirements.

b. Establish special supply levels for low usage, yet essential Titan 2 system hardware.

AIR FORCE ASSOCIATION,
Washington, D.C., February 12, 1982.

Hon. J. JAMES EXON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR EXON: Thank you for your recent letter asking for my views on the phase out of the Titan II ICBM system. I have been out of town most of the week, but want to recap the points I passed orally to Greg several days ago:

While serving as CINCSAC, I reevaluated the strategic value of the aging Titan IIs on a regular basis. The last such detailed look was just before I retired in 1977. The result remained constant—the Titans should not be phased out until a better and more modern ICBM replacement system came "on line". This same situation would seem to obtain today. The fact that Titan II represents our only large warheads in current arms limitation counting; that Titan II costs are mainly "sunk" costs; that it is a significant system in-being, relatively inexpensive (but not cheap) to maintain; that the improvements made in the aftermath of the accident in 1980 have enhanced the safety of Titan II operations; and that MX will not come "on line" for several years nor will it compete for the Titan II basing structures, would seem to validate the desirability of their retention.

It is my understanding that the Air Force recommended deactivation of Titan II based on the need to modernized our strategic land-based missile system and the fiscal trade-off pressures imposed by economic constraints on future budgeting. Also, I surmise that the initial decision to deactivate the Titan II missile was driven by the Administration's public announcement that the MX could be deployed effectively in those Titan silos. With the Defense Department now accepting the results of Air Force's study and electing Minuteman silos for the initial MX deployment, it would seem that the only argument for retiring the system without a quid pro quo in arms reductions on the other side is one of fiscal constraints.

I agree with the basic concern you expressed that we might be on the threshold of phasing out the Titan IIs unilaterally, prior to an operational deployment of MX. If it were necessary or feasible to use our Titan silos for MX basing, that would affect my thinking, but it isn't; that judgement has now been validated by the recently announced decision on MX basing in the Minuteman fields. My thought in this instance would be different if it were decided to employ any portion of our attrition stockpile of Minuteman IIIs to the Titan II silos, but I know of no decision to do this—additional Minuteman IIIs (even Minuteman IIs) would be better than the Titan IIs, and the Titan IIs are better than nothing.

The contributions of Titan II to the SIOP are undeniable, albeit liquid fueled, lacking modern accuracies, and requiring larger crews for support. The gap in operational ICBM megatonnage vis-a-vis the Soviets, brought on by an unreplaced deactivation of Titan, will exacerbate an already perilous strategic imbalance and seem to weaken our START negotiating positions. The strategic requirement for Titan II during the mid-1980s will, in my opinion, continue until the adverse SIOP impacts are redressed by the B-1, ALCMs and MX operational deployments. (And, I know you are aware of how strongly I feel about the need for these strategic modernizations.) It is not inconceivable that some additional Minuteman IIIs could be used in Titan II launchers; but retaining launcher silos without operational missiles on such launchers is pretty "thin soup" for START negotiations.

I appreciate the fact that viewpoints vary on the value Titan II has as a "bargaining chip" in the START negotiations with the Soviets, and that one cannot be too adamant in such subjective issues. In fact, some respected arms control experts play down the strategic importance of Titan II, arguing that its operational utility has declined over the years to the point of negligible impact. Nevertheless, today's operational Titan IIs, on launchers, represent fifty or so large operational ICBMs in our current inventory and I think that your point is well-taken—it makes good sense to keep Titan II in place during the START negotiations until MX becomes operational or until Minuteman IIIs are deployed in the Titan II launchers. If we have in hand a comparable negotiating concession from the Soviets justifying deactivation of Titan IIs, such concession is not known to me.

We have already experienced several instances of unilateral draw-down and slowdown of our strategic force modernization. Thus, it seems to me that unilateral deactivation of the Titan II operational missiles is bound to have an adverse effect on our negotiating leverage in START.

Senator, I appreciate the fact that you would seek my views in this matter and was glad to provide them orally to Greg, and in this letter. I would hope that fiscal constraints will not deny us the essential strategic modernization recommended by the President nor force us to forego any of the strategic advantages that we now have, until and unless we can negotiate a relatively improved situation vis-a-vis the Soviets. I think you have put your finger on one such possibility, and I commend your vigilance.

Respectfully,

RUSSELL E. DOUGHERTY,
General, USAF (Ret.).

SCHOOL OF ADVANCED INTERNATIONAL STUDIES,
THE JOHNS HOPKINS FOREIGN POLICY INSTITUTE,
February 1, 1982.

Hon. J. JAMES EXON,
U.S. Senate,
Washington, D.C.

DEAR SENATOR EXON: The questions about the Titan II retirements contained in your letter of January 15 are pertinent ones. It had been the plan of the Carter administration to phase out the Titans when the MX missile phased in. That would have begun the Titan dismantlements in 1986; the Reagan administration's proposals of last October would complete the Titan II phase-out at that time, after beginning them this year.

As is the case for your January 15 letter, I will not address the issue of a survivable mode for basing the MX missile; my views on this have been made known publicly and at length. With respect to the Titan II missiles themselves, their contribution to our strategic capabilities are not large. But neither are their costs. Thus the decision is a matter for judgment. The Titans add only a modest number of aim points, small compared to the existing total of aim points and small compared to the number of Soviet ICBM reentry vehicles. However, they are a significant portion of our ICBM deliverable megatonnage, and thus can be expected to make some contribution to deterrence. Reducing our ICBM capabilities, however marginally, seems to me to advance neither strategic arms negotiations nor to redress concerns about the "window of vulnerability," no matter how overblown some of those concerns were to begin with.

It is true that there had been safety concerns about the Titan II missiles and their liquid propellants. Perhaps the best argument for early retirement of the Titans is that, should there be further accidents, it might make public acceptance of present deployment of ICBMs difficult to maintain. But the last Titans, under the administration proposal, will not be phased out earlier than they would have been under the previous plan; thus the safety and public relations problems remain.

On balance, I conclude that, especially in the light of the delay in deployment of the MX in a more survivable basing mode, it would have been wiser to retain the Titan IIs through the middle of 1980's, as the Carter administration had proposed.

Sincerely yours,

HAROLD BROWN.

General DAVIS. I would like to reserve and follow up in detail, Mr. Chairman, with the safety modifications that have been completed.

Senator WARNER. And you indicated there would be additional safety items?

General DAVIS. For those that remain on alert; yes, sir.

Senator WARNER. Supposing there was a decision to retain part of the system, would you add further safety measures?

General DAVIS. Yes, sir.

Senator WARNER. And what sort of cost parameters would be involved?

General DAVIS. A total cost of about $60 million.

Senator WARNER. Senator Exon?

Senator EXON. Thank you, Mr. Chairman.

The statement has been made by Dr. Wade that we could save hundreds of millions of dollars. I think specifically we are talking about $500 million according to the Department of Defense and, with previous testimony that we heard from the Assistant Secretary of Defense in open session in the Armed Services Committees, he said it would be fair to estimate that it would possibly be a saving of $100 million a year for 5 years.

So, while a savings of hundreds of millions of dollars certainly are worthwhile and worthy of consideration, when we are talking about an increase under the President's budget for Defense next year of some $33 billion, I think we had better look very carefully whether or not it is wise and consistent with our overall strategic defense policy to be pulling out these Titans before and simultaneously with the placing of the MX in some kind of an acceptable and survivable—likely survivable—basing mode.

Senator Dole made the point, and I thought it was a good one which was substantiated by our two witnesses now, "Yes, we could stop at any time, pulling out the Titans."

The difficulty is that if we have half of the Titans pulled out and we meet some kind of a crisis, we cannot put them back in. I think that is the other side of that equation which we should certainly look at.

I would like to also say at this time for the record that former Secretary of Defense, James Schlesinger, who served as Secretary of Defense in the administration of President Ford, the head of the CIA under President Nixon, and Secretary of Energy under President Carter, has authorized me to say that had he been able to be here today—which he would have liked to have been—he thinks that the timing, pulling out the Titans at this time, is not in the best interest of national security.

Those are all the questions I have at this time. Mr. Chairman, I assume we will have another round.

Senator WARNER. Senator Dole?

Senator DOLE. I just want to follow up. Senator Exon indicated that once they are out, they are out. That is a fact, right? You talked about the launchers. Say we start phasing out the Titans and a crisis develops, what are you going to do with those Titans that are taken out?

General DAVIS. The boosters will be preserved and used in space shots. The process is not irreversible.

Senator DOLE. So that you might be able to use them in any event.

General DAVIS. Yes, sir.

Senator DOLE. Are you going to fill up the holes?

General DAVIS. No, sir; they will be kept in caretaker status.

Senator DOLE. And the launcher will be there?

General DAVIS. In caretaker status.

Senator DOLE. So, when we remove the missile you don't keep them in your pocket but they are somewhere close by, I understand.

General DAVIS. They will be broken down into parts. The fuels will be stored either at Houston or Vandenberg, and the component parts will be broken down.

We will insure at least for a short time that the process is not irreversible.

Senator DOLE. But for all practical purposes, once the missile is removed it is finished.

General DAVIS. That is right. We do not envision putting it in storage; no sir.

Senator DOLE. So, we are not just going to take it and put it away for awhile, and if you need it you put it back in?

General DAVIS. No, sir.

Senator DOLE. But it is not irreversible.

General DAVIS. No.

Senator DOLE. That is a distinction with a difference, I assume.

General DAVIS. It is.

Senator WARNER. I think we have to make that clear. Once that missile is taken out, it is going to be dismanteled.

General DAVIS. That is right.

Senator WARNER. Parts of it, I think, will be irretrievably lost and there is no chance to go back and reassemble it, given the fact you might have the period of time in which to do it.

General DAVIS. It would be extremely difficult to do that.

Senator EXON. Mr. Chairman, can I follow that up?

Senator Warner. Have you finished Senator Dole?

Senator Dole. I was going to say it is not irreversible.

General Davis. No. I will have to make sure of this, I have to check the process and I will provide for the record[1] how long after removal from their silos we could recover them. In other words, if we dismantle them the first of January, could we up until the first of December put them back together? I do not know the answer to that. I do not know how long that period is.

Senator Warner. Senator Exon?

INITIAL FIRST ATTACK

Senator Exon. Mr. Chairman, I just have to break in and ask a question. All of our strategic planning has—as far as I can tell regarding ICBM's—been based on the theory that we are trying to protect ourselves from a surprise initial first attack by the Soviet Union.

Now, I guess that there is a fear on the part of some of us that since it takes less than 30 minutes to get that Soviet missile from there over to here, there would be little chance that if we had even an hour's notice we would be able to reassemble those missiles in silos to do any good.

So, I really think that kind of a line of argument maybe softens the blow, but it does not take away from the basic fact that, once out, they are gone for all practical purposes.

General Davis. Senator, might I mention strategic warning? A matter of days or weeks.

Senator Exon. How many days or weeks do you think it would take to put those back in there, General?

General Davis. If the process were underway, probably a day. It depends on what stage you are at.

Senator Exon. Oh, you mean that you are going to locate these and have the personnel around, handy, so that you could rush out there in a truck and put them back in the holes in a day?

General Davis. It depends on what stage you are at.

Senator Exon. I would think so.

Senator Dole. Could I just follow up there? As I understand, the Titans would never have been too effective in a surprise attack in any event, would they?

General Davis. If you launch them before the arrival of attacking warheads certainly they would survive.

Senator Dole. Yes, but after arrival they probably would not be very effective. [Laughter.]

General Davis. The survival rate is not high.

Senator Dole. That is what I mean.

Senator Warner. That is the point.

General Davis. The survival rate is not high.

Senator Warner. Dr. Wade, would you care to amplify the answer with respect to any contingency plan whereby after this missile is removed from the tube it could be restored to an operating status?

Dr. Wade. Thank you, Mr. Chairman.

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[1] See answer on p. 4282.

I would like to make the observation that you have to weigh this problem on more of an aggregate scale. It is just not one weapons system we should be worried about here.

For example, we have put our limited resources into optimizing our total force package. We have a new air-launched cruise missile being deployed in December of this year. We are currently deploying new Mark 12-A's reentry vehicles on our Minuteman III force. We have the new B-1B starting production soon, followed later by the ATB. The B-1B will be on line in 1986. We are placing signficant additional resources into our command, control, and communications system; and, we are starting soon the production of the new MX ICBM.

These new systems are moving along. The D-5 is now being designed. We have planned an IOC for this new SLBM system in this decade.

If we have a crisis, that crisis might develop over time. You can then start making moves like accelerating gur cruise missile deployments; moving forward toward deploying test Minuteman assets in the old Titan launchers; or airborne alert. We have many options. The crisis may not be short in duration. What we have here is a program that has many new systems being produced, and we can accelerate those appropriate at this time, as required.

The Soviets now know that this Government, and this Congress, are serious about redressing the balance, and not by racing the Soviets RV against RV, bomb against bomb; but, in the context of a force that is survivable in an enduring sense, both over the near and the far term. We are trying to move away from any destabilizing arms competition, and that is the thrust of the whole program.

Senator WARNER. Go ahead.

Senator DOLE. As I understand it, they are going to be taken out of Arizona first, and then Arkansas, and then Kansas. Is that the order of phase out?

General DAVIS. We have only determined Arizona first, Senator. We have not determined the order at this time.

Senator DOLE. You are not going alphabetically.

General DAVIS. No.

Senator DOLE. So, we still have a chance of being second. We thought it had been announced that we—not for any reason that we could think of—would be third. I mean, there may be a good reason. When will the phaseout start, then?

General DAVIS. In October.

Senator DOLE. And it will be what, one a month?

General DAVIS. It will take us 2 years to phase out the first wing. In other words, nine the first year, nine the second year. Then we will start on Wing 2, after 2 years. We have not decided which of those wings yet.

Senator DOLE. Thank you.

Senator WARNER. Dr. Wade, let us go back to an earlier question. I think you have quite properly indicated how this phaseout is balanced by other systems coming in. There is much testimony in the record about, if a decision had to be made to stop phasing out the Titan, where are these various missiles at some point in time?

Let us say hypothetically that nine are removed in fiscal year 1983. I want to make it clear, those nine missiles once removed from the silo—to the extent you can tell us in open testimony—what happens to them and, is there a possibility that they could ever be reassembled and returned if that were to be the judgment of the Commander in Chief?

Dr. **Wade**. Mr. Chairman, it is my opinion at this time that once the missile comes out, that we have a need for the booster for other programs. We will be using it to launch space systems.

As far as the warhead is concerned, we also have a utility for that. So, I would note that once these missile elements come out, they are going to be used elsewhere. It is basically a poor idea to think about putting them back in the silo at a later date.

Senator **Warner**. If not impossible.

Dr. **Wade**. Yes, sir.

Senator **Warner**. That was the point I wanted to make. Any other questions?

Senator **Dole**. Well, that would not be irreversible, for all practical purposes.

TITAN DISPOSAL

Senator **Warner**. Senator Dole, just so everyone is clear, it has been my understanding based on a lot of study, once that missile comes out is disassembled, the parts go in different directions, they will be used for other programs both in the military and out of the military.

Any thought that, even given a period of time—say 4 or 5 months—to make a decision to go back and put them together again is really not something we would want to do.

Senator **Exon**. Do you agree with that last assessment, General Davis?

General **Davis**. Yes.

[Additional information follows:]

Titan Disposal

We agree. Once the missile and selected components are removed from the missile silo they will be used for other programs. Additionally, SAC has been directed to support the remaining alert missiles to the greatest extent possible by using parts removed from the deactivated missiles and missile complexes. Successful accomplishment of this objective has a fallout effect. For example, sources for parts begin to disappear, Air Force depot repair capabilities are disbanded and the resources used elsewhere. Plans are being developed to use Titan II propellants in the Titan III program, for Service Life Analysis Program engine firings and other national requirements. Since some of these propellants will be consumed, it would be necessary to manufacture additional propellants to replace those expended.

The Air Force is also compiling a "Save" list. Items identified on this list will be removed from the missile silos and returned to the supply system for use by any requesting agency. Therefore, a decision to put them back together again, even though theoretically possible, would be a very lengthy and expensive process. The time period to return each site to an alert configuration would be approximately four months, assuming removed assets could be retrieved and experienced people had not been reassigned to other areas.

Of course, we will have the option to halt the deactivation process at any time during the five year drawdown should events warrant such action.

Senator **Exon**. Dr. Wade?

Dr. **Wade**. Sir?

Senator **Exon**. Would you agree with that last assessment of the chairman?

Dr. WADE. Yes, sir.

Senator WARNER. Senator Levin?

COST OF STRATEGIC MODERNIZATION PROGRAM

Senator LEVIN. As I understand it, the total cost of the strategic modernization program is about $180 billion, something like that.

Senator EXON. Over 5 years.

Senator LEVIN. And the reason that we are removing these Titans is safety, you tell us. I can understand the safety requirements, I know Senator Dole can understand them because they are in his State.

But I have trouble with the reduction to save $500 million when we are investing $180 billion to close that window of vulnerability.

Senator Dole is right in raising the safety question; I think that has to be addressed. He represents his constituents as well as anybody could and it is a very proper question to raise. I think we have to be certain that that question is satisfactorily answered.

But if it is answered and if we are satisfied that safety is not the reason but, as Dr. Wade says, we are doing this in order to finance modernization requirements for strategic improvement, I must tell you, to discard 30 percent of our megatonnage in order to achieve less than 7 percent of the cost of strategic modernization does not make any financial sense to me.

A $500 million saving, that does not finance much of a $180 billion improvement—less than 1 percent—as a matter of fact, less than three-tenths of 1 percent.

So, the safety question, I think, is an important one, a critical one and I want to study that, look at the materials that you are going to introduce in the record, General Davis, and the materials that Senator Exon has already put in the record.

But on the financing aspect, I must tell you, I do not think these figures make any sense at all, Dr. Wade. We have been told there is this "window of vulnerability" and it is driving us to build an MX missile before we even know how we are going to base it. That is how drafty the wind is that is coming through that window.

I think the American public really feels vulnerable, it has been told we are vulnerable. We have a window that is opening up. It is opening up during the very period that we are removing a third of our ICBM megatonnage.

Now, I know that is only one factor in terms of strategic capability. I know that accuracy is more important, that the number of delivery systems is more important, and warheads may be more important.

Of course, you have heard a lot about megatonnage during the 1970's. That was one of the reasons we were told we should not ratify SALT—because we "bake" the Russian extra megatonnage in place. That was one of the arguments why we should not have ratified SALT—because of their heavy megatonnage advantage and because we are way behind them—which we are, in megatonnage.

This just puts us further behind them. But nonetheless, I think everybody will admit, whether it is a major factor or minor test of strategic capability, it is one measure of strategic capability and we are just giving up 30 percent of it.

I know we are bringing in other things, but that does not mean we should give up what we have. Right now, obviously, you do not want this kind of a weapon, it is not your first choice of a weapons system, it does not have the accuracy, it does not have some of the other advantages of an MX missile.

But it has a megatonnage advantage and we are giving it up with no return at the bargaining table. We are giving it up to save $500 million, and it seems to me that when you are looking at a $180 billion cost we are not really gaining anything.

One question of Dr. Wade. If we are doing this to save money, Doctor, why do we not do it more quickly and save money more quickly?

Dr. WADE. Senator Levin, there was not only a decision to buy new aggregate strategic force, there was also a question of how you phase the new elements in and phase the old elements out.

As General Davis correctly has noted, there was an assessment made of how to bring these old systems out as the new ones come on line. We tried to optimize our resources, the effectiveness of the forces, and save money.

I would note here in reference to your $500 million comment vis-a-vis the multibillion program, if you try to judge each issue vis-a-vis the $180 billion figure cited, you can argue that everything is marginal when you look only at these single issues.

These programs do cost a lot of money. The American people are supporting the program, but they are also asking us to make sure we are spending our money wisely. If you ask yourself the question, how many of these Titans would survive in the near term from a Soviet attack, the answer is, perhaps one or two, maybe zero. That is when you should start counting up megatonnage, not before the Soviet attack. That is what deterrence is all about. Then from the Soviet side, what target value do they threaten?

Senator LEVIN. Well, by that measure our present Minutemen do not survive, either. By that measure the MX's that we are putting in Minuteman silos are not going to survive.

You are telling the American public we ought to put MX missiles in Minuteman silos, knowing darn well they will not survive either.

Dr. WADE. What we are talking about here is spending money for the future in the sense of optimizing our forces. We cannot do anything today about the forces that are currently deployed. You are asking about money for the future and how to spend it wisely. In that context we should spend our money toward systems that will survive and endure.

Senator LEVIN. Except for the MX in the Minuteman silos.

Dr. WADE. The MX in Minuteman silos is a first step. As we went through this earlier in our discussions, there is significant gain to be achieved by deploying this new weapon system during the interim period while you move toward a viable, long-term, enduring solution.

Senator LEVIN. Are they survivable?

Dr. WADE. You have with MX the B-1B bomber that is being deployed in this time period, adding toward overall force endurance.

Senator LEVIN. No, I just want to talk about the MX's in the Minuteman silos; are they survivable?

General **Davis**. Their survivability is higher than Titan.

Senator **Levin**. But we would not call them a survivable system.

General **Davis**. Not survivable to the extent that deceptive basing is.

I would like to correct one point. Senator, you used the figure, 30 percent of the megatonnage. For the record, it is 25 percent of the land-based ICBM total, but the percent of the total megatonnage of all systems is what you have inferred by your comment. That is around 10 or 11 percent.

Senator **Levin**. If I gave that inference I stand corrected, thank you. I will settle for that, 25 percent of the land-based megatonnage and 11 percent of the overall megatonnage.

General **Davis**. Some figure like that.

Senator **Levin**. That is fine. Thank you, Mr. Chairman.

Senator **Warner**. Thank you very much, Senator Levin.

Just to summarize, there are five different reasons to substantiate this decision to phase out Titan.

First, there is the measure of safety.

Second, savings of dollars such that newer systems can come on and replace and strengthen the overall strategic capability.

General **Davis**. During a time of constrained resources.

Senator **Warner**. Right. Third, they are less accurate.

Fourth, they are the least survivable of the land-based systems.

Last, we are moving into a new doctrine of targeting, and as such the newer systems that come on match that new doctrine as opposed to this which is really the first major land-based system.

Is that a correct summary?

Dr. **Wade**. Yes, sir.

General **Davis**. I would say that is correct.

Senator **Levin**. Can I follow that up with one question, Mr. Chairman?

Senator **Warner**. We just cannot pick out one item, we have to look at the composite of the reason.

Senator **Levin**. I think that is a good summary. General Davis, I believe you said, though, that if you could keep them, you would?

General **Davis**. I said in an unconstrained environment where money was not the object, I would keep them until I could get newer systems on line.

Senator **Warner**. That is important, to refine that question and answer. If you were given $500 million over the next 5 years for the purposes of our strategic system, over and above the present budget, would you use that $500 million to retain the Titan, or would you put the $500 million elsewhere?

General **Davis**. I would put it into modernization, not Titans.

Senator **Warner**. That concludes the testimony from this panel. We will now have General Dougherty and Mr. James Litsey.

General Dougherty, would you acquaint the committee with your own schedule; do you have time constraints?

General **Dougherty**. No, sir, I do not.

Senator **Warner**. I am wondering if a four-star would yield to the captain in view of, the captain has come all the way from Kansas and must be on an airplane by 6.30.

General **Dougherty**. Of course I would.

Senator **Warner**. That is very gracious of you.

Mr. Litsey, how do you wish to be addressed?

Mr. **Litsey**. Jim.

Senator **Warner**. All right, thank you very much. Would you care to introduce the witness, Senator Dole?

Senator **Dole**. No, I just want to indicate to the committee that Jim Litsey knows a lot about the Titans, having been a commander, and is also now, I believe, actively involved with some of the litigants as a result of the Rock, Kans. incident.

He has, I think, almost on a daily basis, followed the progress of some of the changes made to help insure the safety. So, I am pleased that he is here.

Senator **Warner**. Mr. Litsey.

STATEMENT OF JAMES LITSEY, FORMER TITAN MISSILE COMMANDER

Mr. **Litsey**. Mr. Chairman, I usually like to follow; it is a lot easier to follow than it is to go prior.

Senator **Warner**. I will accommodate you if it is your wish.

Mr. **Litsey**. I have a daughter in the hospital and I would like to get back.

Senator **Warner**. That is my understanding, we appreciate that.

Mr. **Litsey**. The last flight is at 6:30. I will be glad to let General Dougherty go first if you think there will be time.

Senator **Warner**. We are on track now.

Mr. **Litsey**. Mr. Chairman, distinguished Senators, I think I would like to qualify first the fact that I have not been in the system on an active basis since 1973. I served as a deputy commander and a commander of a Titan II ICBM at McConnell Air Force Base during that period, late 1969 through August of 1973. I did maintain through the grapevine a lot of contact with people through about 1976. There is about a 2-year span in there where I did not have a real close contact with the system.

It is no secret that I was Republican nominee fgr U.S. Congress from Kansas' Fgurth District in 1978, at which time Rock, Kans., occurred.

One of the reasons I was running was because of the fact that I had concerns about the system and—no inference to General Davis or General Dougherty—the system just does not work in such a manner to allow the man at the top to always know everything that is going on at the bottom. He is ultimately responsible, unfortunately for him, but the facts are that there are a lot of things that occur down at the lower levels.

We have a saying in the Air Force, "CYA" which means "covering your posterior." This often occurs, and the generals do not always get the real facts.

I would hope that I am not being to presumptive and that this committee is fairly well informed on the Titan II system as far as layout. If I say something that does not make sense, please correct me and I will step back.

I would like to, in view of the time, go ahead and put some things into the record and hope that this can be a first step toward communications with some of the hinterlands and some of the people that are not necessarily near the top, but who do have a handle on things that are progressing.

If I can answer a question I will be glad to follow up. I do have contacts, and obviously those contacts have been important to me. I have been, as Senator Dole inferred, acting as a consultant to the legal counsel on behalf of the plaintiffs in the Rock, Kans., accident.

Three were settled in Houston in January 1981, and currently, this last week, on Wednesday in fact, 36 cases involving the causation—it was a bifurcated trial with determination of cause of the accident in Rock, Kans., as the first item on the case agenda. This resulted in a settlement, an agreement between the U.S. Government and Martin Marietta as to responsibility without admission of liability.

I have no political intentions this year. I appreciate the privilege to be here. It was on very short notice, so I do not have a prepared text for you. I do have a prepared statement in outline form that I would like to make.

Currently I am serving as an investment banker in Wichita. As such, as I explained, I have contact with McConnell personnel and people in that area.

I think the question that comes out over and over again is not the question of whether we need the MX, it is the question of when and how we are going to proceed with the phaseout of the Titan II. I think that most of us would agree that we need the "Peace comes through strength."

I have no qualms about that. I think the question of whether it is a phaseout that is based not upon using it as a bargaining chip—I think is the word that has been used—but rather whether it is a question of the Titan II and MX programs coming together as an implementation of a "planned superiority."

Obviously, the MX has a lot less hazardous conditions associated with it just simply by the fact that the propellants on the Titan II ICBM are extremely hazardous. The threshold limit value for oxidizer is 5 parts per million, the threshold limit value of fuel is 0.5 parts per million. At that point in time you are supposed to have on a gas mask. That is not very much—referring to parts per million.

Oxidizer, as exemplified at Rock, Kans., hits your lungs and turns the moisture to nitric acid. It is not a very beautiful sight. We have several people that were hurt from the accident at Rock, Kans. Yet, I think everyone in that area, and the people even who were injured, are for a strong defense.

The fact is that MX will have some liquid propellants, but they will not be in the volumes that you have on the Titan. Hopefully, you will not have the maintenance problems that Titans have.

I have seen Air Force messages after Rock, Kans., which allegedly—according to the Air Force reports—did not have a filter in line, where they had to grant a waiver to allow Little Rock to transfer propellants without a filter, because they could not get the filters. There are logistics problems such as that.

Obviously, the MX as a hardened situation allows more of a "planned response" than the Titan does. On the Titan, basically you are talking about "launch upon attack."

Whether you go with a phaseout of one Titan a month or every 1½ months or if you or the President goes with another alternative to phase out the Titan and implement MX, I think there are certain items that need to be addressed as representing the minimum items that would get by most of the major areas of safety concern.

There have been a lot of safety changes. I am not familiar with all of them. There is a court gag order and I have not been able to obtain everything that I needed to bring; but I do have information on some things that I do not believe General Davis even has unless he had access to the testimony at the trial.

Basically—and I rely upon experts just as you rely on staff members and experts also—basically I am told that if we phase out three sites, there will be parts available which will substantially reduce the maintenance cost of the Titan missile. One at each base in areas of encroachment would be the ideal. Davis Mountain has encroachment in two areas that are extremely troublesome, where the Air Force told an elementary school that it was safe to build a missile silo about 2,000 feet away.

I have been on record as saying that was just ridiculous; there is no excuse for that. It should not have happened; it did happen. I think we have to look at the safety of the children. Just because it is not downwind does not mean the wind cannot change direction. It may be 2,500 feet, but it is very, very close and I have seen it near Catalina City.

I have 10 items in particular that I would like to read into the record, things that I would suggest that the committee weigh, go to the Air Force, find out how much it costs. I am coming from reliable sources as a backup to this.

Item No. 1 would be to rework all of the blast dampers. You may or may not be familiar with blast dampers. What they are, they are items, hardware in a silo, which allow the air to flow from the control center—where the missile crew is—out to the silo and allegedly prevent any toxic vapors from coming back up into the control center.

These blast dampers have a lead seal—lead does not do a very good job of sealing toxic vapors coming back under extremely high pressure. What they need to look at is, No. 1: (a) rework all of the blast dampers, that is overhaul them. There are two per complex; (b) install propellant-resistant rubber seals. This buys time. This will buy time for the crew members either to escape or to control the hazard before they have to evacuate, if they do, if there is another hazard; and (c) move the control for blast door No. 9 (which is the last door before you go into the silo) move the control of that back into the control center. Basically the reason for these three items, is to get control in the hands of the crew and obviously try to prevent vapors from reaching them.

The current status on these seals is as follows: Davis Mountain has requisitioned nine of these rubber seals; Little Rock has requisitioned five; McConnell may or may not have any. So, right now basically you have a force out there with lead seals that really will not protect the crews if we have another Rock.

Item No. 2 that needs to be addressed is visual inspection of the blast door seals, especially No. 8 and No. 9 since those are the two between the control center and the silo.

You need to look to be sure the bellows are out, that they are not torn; and that there is good connection between the four corners. What we are talking about here is just trying to protect the crew. It is very hard to simulate whether those will really work the way they are supposed to. At Rock it is recorded that they did not.

Item No. 3 would be to seal off all conduits between blast door 9 and the long cableway which goes to the silo. This is a little technical, but I appreciate your patience as I read this into the record so you can have meaningful consultation with the Pentagon.

Between the long cableway and the blast lock areas, which are the areas as you come down into the silo—let me ask you, gentlemen, are you familiar with any of the layout in the interior of the silo?

Senator **WARNER**. We do have diagrams here.

Mr. **LITSEY**. As you enter the underground portion you come to door 6, which is interlocked with door 7. You can turn left to go through door 8, the short cableway to the control center, or you can go through door 9 to the silo.

What I am talking about is the area between door 8 and door 9, the area between the silo, basically, and the control center. Those conduits need to be sealed off, again to prevent vapors from coming back. Also, in the area between the first two doors you come to, there is a hydraulic system that has conduits going into what is called the decontam area which is on the silo side of door 9.

That area varies from complex to complex—where those particular conduits go through the wall—but they need to be sealed. We are talking about protecting people.

Item No. 4. Whether it is a planned phaseout every month or whether it is a planned phaseout after 5 years, item No. 4 would be that you need to go ahead with a fixed PTS mod. When I say PTS, that is propellant transfer system, modification of that system to try to bring it into a stage where it will operate safely until the system is finally phased out. That is what all these are in relations to.

It would be suggested that you remove all ground half quick disconnect valves, which is one-half of the valve involved at Rock, Kans., which was propped open by an "O-ring," a little teflon ring that slipped down in the piping and jammed it open. Remove all eight of them from each complex. It would then be possible to keep them in a much better condition. They would be lubed: they would not be out in a contaminated atmosphere; they would not be dirty; and they would work well.

You need about aproximately six per base to cover tank pressurizations. You would take two out for each tank pressurization (one is a back-up) and you would need about 16 per base for PTS operations involving on-loads and off-loads of the missile.

The question was raised before, how long does it take to get them back in?

I cannot agree with General Davis, you could not do it in 1 day. You would not have enough equipment; you would not have enough suits; you would not have enough of anything to get them in in a day. The only way you might be able to do it is if you threw everybody out there, whether they were trained or not, without protective clothing. At that point they would be considered expendable, of course. But the fact is, you could not do it.

Removing the ground half is item "a" for the record, under item 4.

Item "b" under item 4, which is PTS fixed modification, would be to install the Titan III 20-mesh drain on the QD. I asked the court through the attorneys yesterday to allow me to bring an example for you to see. At Rock, Kans., the ground half quick disconnect valve that we are talking about, which stands about this high, is the same quick disconnect valve that has been used on the Titan III system.

The only difference is, on the Titan III system—which Martin Marietta runs—they chose to put basically two conical sections together, put a screen in the filter in front of the quick disconnect valve.

Gentlemen, that was 1967. I submit to you it is a matter of court record, had that screen been on the valve in the Titan II systems in 1978, Rock, Kans., would not have happened. The O ring could not have gotten into the valve.

At the same time, as you look at this particular valve you need to realize that testimony—and I would encourage you to get the testimony if you can—testimony through depositions and live witnesses in a court of law has shown that if a pin on the quick disconnect which extends when the valve is completely screwed on to the missile, had that pin been extended two-thirds of an inch, the men disconnecting the valve at Rock, Kans., would have known that in fact they had an open valve. I appreciate the fact this is technical but it is extremely important because General Davis, I do not think, is planning to put the screen on the Titan II. I do not think he is planning to spend a few pennies to extend that pin out.

I do not think they are planning on taking the proper procedures that need to be implemented on that particular item in that particular case.

Item c under the PTS mod would be additional changes involving more technical items. I would be glad to supply the committee with those items, I will not belabor the point. But generally what I am speaking of is removing certain pumps for the stage II operations. Right now you can pressure off-load stage II, you do not need the pumps. The pumps tend to bog things down. If you have a tank rupture you could use a portable pump for that instance.

Also, right now, currently, they are using a stage I system that involves a portable pump down in the pump rooms to off-load a missile. What needs to be added and looked——

Senator WARNER. Let me interrupt you for 1 minute. Is it possible that at some point we could get some of this to put in the record? I think you have made a very clear case with respect to your own personal views based on experience that, in your judgment, corrections to this system are needed.

The subcommittee is looking at the overall strategic implications, the cost implications, in addition to the safety implications.

You have addressed certain aspects of the safety. Are there any views you wish to convey with reference to cost or strategic?

Mr. **Litsey**. Sir, I appreciate what you are saying. For the record, why do I not highlight the rest of this and supply the committee in the future with a typed copy?

Senator **Warner**. Very well.

Mr. **Litsey**. Item No. 5 would deal with the RTMN modification, which is the radio communications. That is being improved, they are to be complimented for improving this. I will furnish the committee with material on that.

Item 6 deals with moving the vapor detector enunciator panel into the control center where the commander would have better control over the PTS troops, as well as establishing in the control center the ability to look out into the silo.

Item 7 is a recommendation to lease or buy land within a half mile to prevent further encroachment of the sites; at least a half mile.

Item 9 would be to upgrade the accuracy, and this is where we get into the strategy and the viability of the complex, the system.

Mr. Chairman, I would suggest to you that if the committee has not looked at it, that they might want to look at upgrading the accuracy of the Titan II via the guidance system that is installed.

I assume that you looked at it to a degree. It is not the same one that was there when I went in, but as I understand, the latest modification was in 1981. It would take very little change, I am told—little change in the software and very little change if any in the cartridge chips—to upgrade it to an MX capability.

The question is, why upgrade? That would be to MRV the missile, if you so desire. I think these are things that you need to address if you have not already addressed them.

Item 10 deals with the deactivation of the remaining Titan II's and I would just only say, whether it is one a month or whether it is all in 1987, whatever is remaining when the MX comes on board, that it be done on a one-for-one basis—as one Titan comes out, one MX goes in.

There are additional questions and areas of consideration that I have, and concern, dealing with the suits protecting the men. I would hope that you would look into those, that is, whether they are really adequately being tested. Initial reports that I have examined indicate they have not, they have not ever been tested quite properly.

Another question is whether the crews really know that there is a key switch in the control center to turn deluge water into the silo in the event of a spill. The key switch was put in to make the job easier, but even recently it was still not in the tech data to tell them that they could do it.

I think you need to look into security. Costwise, a roving team is a lot more expensive than having one man secure the top side of the complex.

I think you have to look at unauthorized launch. The greatest concern I had while I was in the service was the possibility of an unauthorized launch. While I was in, you were sitting there with a situation where you had a launch-enable system which has since been replaced, and it is now a much better system. But in the days that I was in it was possible for one man.

Senator **Warner**. We thank you, that is a very dramatic summary.

[The written statement of James P. Litsey follows:]

PREPARED STATEMENT OF JAMES P. LITSEY, FORMER TITAN MISSILE COMMANDER

Dear Mr. Chairman and Distinguished Subcommittee Members:

I. Introduction

First, by way of introduction, please allow me to thank the subcommittee and the Honorable Bob Dole for extending the invitation to participate and for providing my air fare to and from the hearings. While operating under extremely short notification and leaving less than ideal conditions in Wichita (i.e., the hospitalization of my two-year old daughter), I nevertheless sincerely appreciate the opportunity to express my concerns, of which I have held many for over ten years. Please know my daughter was released from the hospital the 28th of February and is doing quite well. Your concern and sensitivity to her condition were appreciated.

I hope to approximate the outline followed at the hearings and will attempt to present all technical recommendations in lay terminology as nearly as possible.

Mr. Chairman, may the record show (1) my full name is James Paul Litsey; (2) my residence is 2423 Bramblewood, Wichita, Kansas 67226 (phone: 316/686-4337); (3) by profession I am an investment banker associated with First Securities Company of Kansas, Inc. (address: One Main Place, Box 1321, Wichita, Kansas 67201; office phone: 316/262-4411); (4) since December 12, 1978, I have served as consultant to counsel for the plaintiffs involving lawsuits stemming from the Titan II accident at Rock, Kansas; and, (5) together with my wife (Linda), I enrolled in the M.B.A. evening program at Wichita State University (36 hours completed).

My involvement in the Titan II program commenced upon graduation in 1969 from Baylor University with a commission in the U.S. Air Force. Following weapons system training at Sheppard Air Force Base and EWO training at Vandenberg Air Force Base, I was assigned to Deputy Missile Combat Crew Commander (DMCCC) "upgrade" training at McConnell Air Force Base in November 1969. Later, following on-the-job experience and additional formal training, I was upgraded to Missile Combat Crew Commander (MCCC) and served in that capacity as a captain until August 3, 1973, at which time I separated from the Air Force.

From 1973 to 1976, it was possible to maintain contacts (through the grapevine) and receive updates on the Titan II system. However, in 1976 and extending until August 24, 1978 (the date of Rock, Kansas), I lost contact with the system. It is no secret that at the time of Rock, Kansas, I was the Republican Nominee for U.S. Congress, Kansas Fourth District (D - Dan Glickman). Allow me to hasten to add that neither at this time nor in the foreseeable future do I contemplate undertaking another bid for public office. It is simply a matter of priorities; and my family takes priority.

As a consultant to counsel for the plaintiffs concerning injuries (and in two cases death) stemming from the accident at Rock, Kansas, I once again became deeply involved in the Titan II system. My activities required obtaining voluminous material; and given the reluctance of the defendants to readily supply information, it became necessary to establish contacts and sources of information within and without their organizations. Three lawsuits were settled in January 1981, U.S. District Court, Houston, Texas.

The 36 remaining cases on file in Federal District Court, Wichita, Kansas, completed the first portion of their litigation after two and a half weeks of trial on Wednesday, February 24, 1982, when Martin Marietta's defense caved in and they, together with the U.S. Government, agreed to fixed percentages (sealed) of responsibility without admission of liability. Federal Judge Patrick Kelley ruled during the trial that both the U.S. and Fairchild Industries (another defendant) were absolved from any "design" responsibility for the oxidizer fill and drain quick disconnect valves which stuck open when a Teflon "o-ring" from a filter assembly in the fixed propellant transfer piping system lodged in both the portion of the valve attached to the missile ("airborne half QD") and also in the portion attached via a hose to the silo wall ("ground half QD"). Fairchild has been dropped completely from the damages portion of the trial set for summer 1982 (if a settlement is not reached in the interim). The quick disconnect valve will be discussed in greater detail later in this statement.

II. Why MX?

It is my belief that most of us (speaking to the subcommittee members) believe in the concept of peace through strength; and that without requisite strength, there are forces in this world which would allow us only fleeting moments of peace. Rather than viewing the Titan II wishfully as a bargaining chip, perhaps it is more important to accept the reality forced upon us by years and administrations which lacked the resolve to endure political pressures requisite to the establishment of a superior defense. In this light, it is my opinion that the move to MX is a move away from a forced "launch on attack" strategy toward one of "planned superiority" and "planned response."

Likewise, in addition to telegraphing our resolve to survive to those who would threaten us (as represented by MX and B-1), it is equally important to assure both the public neighbors of the Titan II's and the men who man the silos that they will no longer be asked to shoulder unaddressed safety risks. The MX obviously enjoys a lesser volume of toxic propellants (less hazardous) and also should require lesser maintenance costs on a per missile basis depending on a mode of deployment. While General Davis states that 150 of 200 recommendations for the Titan II from his study group have been implemented, large safety gaps remain unaddressed.

III. What must be done until the final Titan II is deactivated?

Despite General Davis' well-intended assurances that the missile is safe, the following items are proposed basically as absolutes and delineate the prioritization for the allocation of available dollars with the intent of (1) protecting the public; (2) protecting Air Force crewmen; and, (3) assuring national defense will not be further compromised or downgraded. These recommendations are respectfully submitted as applicable and required whether the Titan II's are phased out at a rate of one per month or whether they are not deactivated until the MX comes "on-line."

A. Phase out three Titan II sites for parts

Parts are often scarce. I have seen messages whereby a waiver for Little Rock had to be granted by HQ SAC (and after Rock, Kansas) to allow the loading of propellants on a missile without filters in the lines to protect against a foreign substance jamming open the fill/drain valve as they did at Rock, Kansas. It is often difficult for the Air Force to obtain (in a timely manner) the parts or items necessary from Martin Marietta or their immediate suppliers. Thus, this example is not offered as an isolated incident.

It is therefore recommended that three Titan II sites be phased out over the next three years, one at each base and each in a prominently encroached area. In addition to improving logistics, this step should help reduce maintenance costs. The phased-out sites can be handled in the same manner as the Air Force handles deactivated sites at Vandenberg. Should more than one site be dismantled at a given base, a precaution must be taken to insure that in going to "supply," the parts are not identified as "excess" and then disposed of via "salvage." Probably the first site to be deactivated for parts should be at Davis Monthan, then a second at Little Rock and the third at McConnell. This does not mean public safety might not require additional deactivations in severely encroached areas.

1.a) Rework all blast dampers (overhaul)

Each complex contains two "blast dampers" allowing air to flow by over pressure from the control center to the silo. During a major leak (such as Rock), the reaction of the leaking propellant causes the over pressure to reverse (silo door closed) and push toxic vapors back toward the control center. Closing the blast dampers does not currently solve the problem because most blast dampers have lead seals. Therefore, it is necessary to accomplish item 1.b).

b) Install propellant resistant rubber seals on all blast dampers

By replacing lead seals on all "blast dampers" with propellant resistant rubber seals, the Missile Combat Crew (MCC) and any other personnel located in the control center will be given added time (when in conjunction with other recommendations to follow) to deal with a hazard and/or properly safe and secure the complex prior to evacuation. Additionally, this item, in conjunction with item A.1.a) and others to follow, should enable the crew to evacuate through the escape hatch and ladder in a relatively clean atmosphere rather than being engulfed in toxic propellant as they were at Rock, Kansas.

c) Move the control for blast door 9 to the control center

There are four "blast doors" at each missile complex. When entering the underground area of the complex, one must first pass through blast door 6 and then straight ahead through blast door 7. Both doors are interlocked, meaning both cannot be open simultaneously unless a hydraulic system located between the two is "overridden." After passing through door 7, one turns left to enter the control center through door 8 or right to enter the silo through door 9. Both doors 8 and 9 are interlocked, subject to the same override system; and both open away from the control center (i.e., toward the silo).

Blast door 9 is bungeed closed (similar to holding it closed with a giant rubber band) during Propellant Transfer System (PTS) operations. Unless door 9 is closed and locked by four hydraulically-operated locking pins, vapors from a propellant spill can migrate up to the area between doors 8 and 9. Thus, as maintenance crews evacuate either through the access portal topside (stairs and an elevator are located in the access portal) or through door 8 to the control center, if door 9 is not locked in the process, the control center atmosphere and personnel become further endangered. Furthermore, it would be necessary for someone to go back out to door 9 in order to lock it. This would allow propellant vapors to enter the control center when door 8 was opened and would unnecessarily expose crew members to the propellant.

Additionally, under normal conditions, the crew commander and crew would be afforded greater control of silo ingress as a result of this change.

d) Current status of items A.1.a) b) c)

The Titan II system received approximately 22 new blast dampers in 1981 and approximately 12 blast dampers were additionally overhauled (3 or 4 of which received rubber seals due to notches in the lead seals). Davis Monthan requisitioned nine rubber seals for blast dampers and Little Rock requisitioned five. McConnell may or may not have any rubber sealed blast dampers at this time.

2. Visually inspect blast doors 8 and especially 9

It is imperative that blast door seals be monitored daily and checked to verify (1) the seal bellows out; (2) the seal is not torn; (3) the seal makes a good connection in each of the four corners; and (4) that the seal is not indented (lay a straight edge against the surface).

While blast door seals were worked over about three years ago, neither the Air Force nor its personnel should be content with sense of security in this area. One problem: it is difficult to adequately test the seals on complex and thus know for sure the seals will work adequately. A smoke bomb would check the system superficially if discharged between doors 8 and 9, but it is next to impossible to simulate the type of over pressure from the silo toward the control center as a result of a propellant spill such as the one at Rock, Kansas.

3. Seal off all conduits

The complex is filled with conduit piping carrying wiring, for example, from one portion of the complex to another. It is necessary to adequately seal off all conduit openings (1) between blast doors 8 and 9 and the silo; and (2) by HS-3 (hydraulic system located between blast door 6 and 7) where conduits pass through the wall to the "Decontam Area" on the silo side of blast door 9. The latter conduit locations vary from complex to complex.

4. Go ahead with the PTS fixed modification

This modification of the Propellant Transfer System's fixed piping needs to be done. Highlights of the program have already been proven at complex 533-1, McConnell Air Force Base via an engineering test model sometime around late 1978 or early 1979. Additionally, the following items are imperative:

a. Remove all ground half portions of the oxidizer and fuel fill/drain and vent quick disconnect valves

These "QD's" are utilized in tank repressurizations and fill and drain activities for both fuel and oxidizer propellants and mate to their "airborne half" counterpart on the missile. The ground half is part of the assembly which stuck open at Rock, Kansas. Each complex has eight of these items.

By removing the ground half portion of the valve from a flexible hose attached to the silo wall and storing a necessary quantity of the valves at the host base, it will be possible to maintain the valves in a better (safer) working condition (i.e., clean, freshly lubed and not subject to a contaminated atmosphere for two years between uses).

Again, PTS shop allotments will need to be changed to prevent an excessive amount of valves from going to "salvage." Approximately six of these valves would need to be reserved at each base for tank repressurization activities (two for each repressurization, one of which would serve as a back-up) and sixteen would be needed for two simultaneous propellant transfer operations (eight for each operation). To this total of 22 QD's would need to be added a necessary amount of spares to allow for overhaul and back-up, etc.

The ground half QD's should be stored and carried in a closed cell foam box.

b. Install a Titan III 20 mesh screen filter on the Titan II ground half QD valve

(1) Fairchild manufactured the same ground half QD at the request of Martin Marietta (in accordance with Martin's specifications) for use first in the Titan II program and later in the Titan III program. It is the testimony of a Fairchild

employee that in 1967, Martin Marietta added a "twenty mesh" screen/filter to the ground QD on the Titan III. This screen was added to increase mission success probability. It has been determined in a court of law that Martin Marietta had a contractual responsibility to tell the U.S. Government about this item and its possible use for the Titan II system. Martin Marietta never informed the U.S. Air Force of the value of this screen/filter. HAD THIS SCREEN/FILTER BEEN INSTALLED ON THE TITAN II PROGRAM, ROCK, KANSAS, WOULD NEVER HAVE HAPPENED -- IT WAS AVAILABLE ELEVEN YEARS BEFORE THE ACCIDENT -- TWO DEATHS AND NUMEROUS INJURIES WOULD NOT HAVE OCCURRED.

IT MUST BE INSTALLED. It is apparent that during the three and a half years which have passed since the 1978 accident at Rock, Kansas, neither Martin Marietta nor the U.S. Air Force has shown genuine concern for installation of such a protective device.

(2) Testimony of U.S. Air Force employees confirmed that "o-rings" (like the one at Rock, Kansas) had migrated on two occasions prior to Rock down to the ground QD valve even though filters were installed. I mention this because General Davis, both in his study group report and at the hearing, was fond of saying "human error" was to blame at Rock, Kansas. While human factors are always involved, whether the "F-51" filter cited in the Air Force report on Rock was installed or not, the fact is an o-ring still could have gotten into the quick disconnect valves. Additionally, the general is probably not aware that while on September 21, 1978, the Air Force opened the filter housing, took a picture of an empty filter housing and concluded the filter was not installed; the fact is there exists a Martin Marietta (Denver) receipt log of 20 September 1978 (one day prior to the Air Force photo) showing receipt for the F-51 filter and o-ring among other items from Rock. When it came time to analyze the F-51 filter and the o-ring in Denver, neither of these items was available for analysis! Martin has

since admitted destruction of the o-ring evidence and disclaims ever receiving the filter. You be the judge.

(3) Don Plumondon, Martin Marietta Mission Success Manager for the Titan III program, has stated in deposition (in so many words) that the Titan II as a weapons system only has to fire once as opposed to several launches for Titan III launches, that its payload is not as valuable as the expensive payloads atop the Titan III; and, therefore, even today (in light of Rock, Kansas), the Titan III twenty mesh screen/filter is not warranted for the Titan II system. You be the judge.

(4) In addition, the plaintiffs' engineering experts found that while the QD valves basically did what they were designed to do, their design (Martin Marietta's responsibility) was defective. To correct this defect, research and development on the valve is required.

(a) An indicator pin extends when both halves of the valve are fully mated. Extending (lengthening) this pin two-thirds of an inch (extremely inexpensive) would in the past at Rock and will in the future offer visual notification for the PTS troops of whether the ground half of the valve is completely seated (closed) or not when they disconnect the valve. Our experts fashioned a prototype out of a nail at a cost of less than a dollar. HAD THIS PIN BEEN IN PLACE AT ROCK, KANSAS, TWO DEATHS AND NUMEROUS INJURIES WOULD NOT HAVE OCCURRED.

(b) Plaintiffs' engineers secondly found a design need for a "breathing port" between threads on the airborne half of the QD valves. This would help assure knowledge of whether or not the valves were stuck open.

Currently PTS crews are told to observe for vapor puffs or look for liquid drizzle of the propellants during disconnect operations.

Additionally, they are told to insure these are decreasing prior to completing the disconnect. The problem here lies in the fact (1) there exists (as testimony in a court of law) "clean disconnects;" i.e., no visible vapor or liquid indications; and (2) at Rock, Kansas, there was no visible warning of the leak before the disconnect was completed per testimony of the surviving witness. Lest there be any question in your mind with reference to the latter, please be aware that had there been liquid propellant spraying everywhere prior to completion of the disconnect (as the defense claimed), Erby Hepstall (deceased) would have known he was committing suicide by completing the disconnect. You be the judge.

(c) Thirdly, plaintiffs' engineers also found a design need for an interlocking device on the valve to prevent completion of disconnect operations in the face of internally open valves. This item would require research and development.

c. Additional changes

This section deals basically with the need to take out items which are not needed or which have high malfunction rates.

(1) Remove stage II pumps from the pump rooms

There is no need for these pumps to be in the propellant lines since stage II can be and is being pressure offloaded. In the event a pressure offload cannot be utilized (i.e., tank rupture situation), there is a small piping modification which allows for back-up with a portable pump.

(2) Continue using stage I portable pumps; however

(a) Install suction and discharge pressure guages on each side of the pump. You need to know if the pump is really pumping.

(b) Remove (in light of (a) above) all liquid indicators (except one) and all liquid controllers. In place of the latter, install (c).

(c) Install differential-pressure controllers on portable pumps. Current use of liquid controllers is not wise because (1) they have a high malfunction rate; and (2) the transistors are too old. Use of differential pressure controllers should be designed so the pump will turn off within 30 seconds of "turn on" if there is not a differential pressure (i.e., the pump is not pumping).

5. Radio type maintenance net (RTMN) modification

While the RTMN was targeted for update prior to the accident at Rock, Kansas, the wheels have been slow to turn. However, there has been some improvement; and if the targeted changes are completed, the radios will work well.

a. Radio communications during PTS operations are the lifeblood of safety. It is absurd and unsafe for men wearing the rocket fuel handlers clothing outfit (RFHCO) to be forced to communicate with hand signals even when standing beside each other.

b. The new RTMN has been prototyped.

(1) It may be on one or two complexes at Davis Monthan.

(2) The Air Force has already accomplished installation of a slotted coaxial antenna cable which runs throughout the complex. They notched the antenna cable and sealed or protected the notched area to create a multitude of "transmitter/receiver antennae" throughout the complex so one no longer needs to be near the old RTMN antennae to communicate. This is an excellent example of a low-cost, highly practical and yet simple solution to a large safety problem. We need more of this type of creativity.

(3) The new radios and repeater are completely different from the old ones. "You can actually talk and hear," were the exact words of someone who is familiar with both the old and the new. Remember the old ones were designed in the late 1950's to use transistors. Since that time, transistor updates had to be specifically designed and were extremely expensive.

6. Hazard sensors

The study group headed by General Davis identified the need for missile combat crews to have a better handle on hazards as they occur.

a. Move the vapor detector annunciator panel (VDAP) into the control center

(1) This will allow the missile crew and the crew commander to know where in the complex the propellant vapors are actually at when the warning klaxon goes off (without having to leave the control center or rely upon somebody else's word).

(a) Monitoring of the VDAP should be made a crew function.

(b) This removes control from PTS and places it with the missile crew itself.

b. Install a launch duct temperature sensor indicator in the control center

(1) This will allow the missile crew to know if they have a fire or a hot spot.

This, in conjunction with moving the VDAP into the control center, gives the crew the flexibility of item c.

c. Optional spray control capability

With execution of items a and b above, the missile crew commander has the ability to activate or deactivate sprays as warranted by a given emergency situation. The VDAP, of course, shuts off during sprays, but comes back on when the sprays are deactivated. If the hazard was not eliminated, the commander could then reapply sprays as warranted.

7. Lease (or buy) land to prevent further encroachment

While farming should be allowed, no further building should be permitted at least within a one-half mile radius of the missile complex. Actually, this is an absolute minimum, not the ideal. Much would depend on proposed usage of the building. Encroached sites should be the first to be shut down for parts or phased out.

The "general" who told the school board that it was safe to build an elementary school 2,500 feet away from a missile complex near Catalina City, Arizona, was either (1) a complete idiot; or (2) was under orders. This situation must be rectified immediately. It should never have been allowed to happen and it cannot be allowed to continue. Even though it is targeted for phase-out, "soon" is not soon enough in this instance (this is not to say the school board did not use poor judgment).

8. Major spill activities

Items 8.a. and 8.b. will not be discussed at this time. The nature of the subject is such that Martin Marietta and perhaps even the Air Force would target these items for strong disagreement. There is a possibility in the process they would divert attention away from other important items herein.

9. Upgrade the accuracy of the Titan II

As sites are phased out, it is important to assure the defense of the country to the greatest extent possible.

a. Accuracy of the latest Titan II guidance system can be upgraded to do the same thing as MX (with relative ease as pertains to the software and chipcards).

b. Why upgrade the accuracy? To allow the Titan II warhead to be replaced by MIRV.

10. Deactivation of remaining Titans

As the Titan II's are deactivated and regardless of the alternative schedules being proposed, projections indicate several Titans will remain operational until the new MX comes on line. It would therefore be recommended that any remaining Titans be deactivated on a one-for-one basis as each MX is turned over to the Air Force.

B. Additional items

1. RFHCO (rocket fuel handlers clothing outfits)

RFHCO is a self-contained suit worn for propellant operations. While RFHCO has been targeted for new visors, two-hour airpacks, etc., the fact remains that I have yet to examine test documents of the RFHCO which demonstrate adequate testing. From a safety standpoint, too little is known about exactly how much propellant vapor really enters the suiting. I would submit to you that Airman Carl Malinger survived Rock, Kansas, primarily because he was wearing a brand new suit (right out of the box). Mr. Malinger today is severely disabled as a result of the accident. In fact, it is his testimony that he had more oxidizer inside his helmet as he entered the short cableway through blast door 8 to the control center than there was present in the cableway atmosphere. He therefore then removed his helmet to gain access to a lesser contaminated air supply. As he did so, he observed vapors rising out of his helmet which he was by then carrying upside down. Again, his suit was brand new.

2. Water deluge

a. A terminal control cabinet in the missile control center (TC-21) was modified prior to Rock at some Titan II sites including 533-7 at Rock, Kansas. A key switch was installed to allow the crew to dump deluge water more easily from the control center.

However, the PTS manual (T.O. 2-12) was not amended to give the PTS team chief the option to tell the crew commander (if needed utilizing the new key switch). About one month ago, a missile crew was queried as to this key. Their response was basically one of "knowing there was a key switch there, but that was all," as reported to me by an informed source. The fact is this should be a checklist item. If it were a checklist item, the crews would be trained on it.

b. It should be noted that there are two other key switches on TC-21 in the control center to allow the crew to open the silo closure door from the control center. This change was implemented after my separation from the Air Force and is an example of positive change.

3. Security

An open letter is not the place to discuss the specifics of Titan II security, but suffice it to say that security is extremely weak from a design standpoint.

a. It would be less expensive and more secure to station one security policeman topside at each complex, rather than deploying a roving security alert team.

b. Unauthorized entry is easily accomplished.

c. In reference to b above, sabotage is easily accomplishable.

4. Unauthorized launch and vulnerability to attack

While General Davis in his study group report cites the addition of the Coded Switch System (CSS) as an additional hurdle in preventing an unauthorized launch, let us turn to the other side of the coin.

First, CSS was not operational force-wide in the early 1970's as indicated by General Davis. Second, Frank Gaffney of the subcommittee staff has a copy of the 1980 "Titan II Security Classification Guide." On page 33 or thereabout (I believe), you will find a heading entitled "Unauthorized Launch Studies." The facts are (1) even with coded switch, unauthorized launch (and thus accidental war) is admittedly possible and (2) prior to coded switch during the days of the Launch Enable System (LES), it was possible for "one man" to flip one circuit breaker and thus "enable" his missile (shut off the "disable" signal from McConnell). "One man" could then proceed to easily and quickly wire around the system and launch his particular missile.

My point: while the system is better today, it is not good enough. Additionally, we must not forget that technologically less advanced nations may be truly threatening "accidental war." In fact, if one were to ask for "gut" level probabilities, I would respond by saying that nuclear war would have a 75 percent chance of occurring by accident (unauthorized launch), a 20 percent chance of occurring by surprise attack and a 5 percent chance of occurring following a strategic build-up. While General Davis relies on the strategic build-up theory, I could not more heartily agree with Senator Exon as to the likelihood of surprise attack over strategic build-up.

Regardless of the manner in which it happens, the fact remains the U.S. is not prepared to survive. Command and control remain weak (I laud Reagan for tackling this sensitive and controversial issue); Civil Defense is non-existent; and five minutes following a surprise Soviet SLBM launch the Executive Branch, the Judicial Branch and the Legislative Branch of the Republic will no longer exist. The President will not even get airborne and the remains of a post-war country will find itself run by some surviving general.

Thus, it would be in the interest of this Republic to protect Washington and other strategic places with ABM's and the general public with a realistic civil defense capability. Our "will to survive" can be a great deterrent to armed aggression in and of itself.

C. Operational viability/compromised Emergency War Order (EWO) formats

The operational viability of our nuclear forces must be questioned in light of compromised documents both at Rock, Kansas, (undisclosed) and as a result of Lt. Christopher Cooke's escapade.

The nature of the animal at SAC is not to change anything more than absolutely has to be changed. It would appear that former SAC Commander General Ellis and current SAC Commander General

Davis would rather rely on lie detector tests given Cooke than on the precaution of sweeping change of the entire command and control message formats known as the Emergency War Orders. It is not enough to change a few codes and targets. SAC must redo everything from the ground up -- anything less is to roll the dice with national security.

I would welcome discussion of this area in closed session (if need be) with the subcommittee. Frankly, I genuinely question whether you have been or ever will be given the "straight scoop" as it relates to the damage Lt. Cooke's escapade has had on national security. This area is of grave concern and should be closely examined by the subcommittee. If I can be of service in phrasing the questions which you need to ask, please feel free to call on me without hesitancy. Additionally, the only avenue of honor for those whose mistakes made the release of Cooke possible is resignation. There can be no double standard for the brass if the esprit de corps is to be maintained.

Summary

Rather than summarizing the above, please allow me to again thank the subcommittee and Senator Dole for allowing me the privilege of this candid communication. I trust you will weigh it appropriately and feel free to request further follow-up on any specific item.

One parting thought: the news conference this past week demonstrated the need for command and control system upgrade with specific reference to EMP's. This renews an old concern; i.e., unless land-based missiles are involved in a preemptive attack or slip through the EMP window during launch on attack before the EMP detonation, will they not in effect be neutralized as a strategic force?

[From the Wichita Eagle-Beacon, Mar. 5, 1982]

SOVIETS COULD EASILY DISRUPT U.S. DEFENSES, OFFICIAL CLAIMS

WASHINGTON (AP).—The Soviets could knock out the entire U.S. military command system with two or three well-aimed nuclear blasts disrupting communications, a senior defense official said Thursday.

At the same time, the official said, the U.S. satellite-based system for warning the United States against nuclear attack is vulnerable to sabotage because a relatively small number of "guys with wirecutters" could disable cables leading from satellite ground stations to command posts.

The official gave these graphic statements on the vulnerability of the U.S. command and control system to a group of reporters in a session apparently designed to generate support for the Reagan administration's costly plan to correct such weaknesses.

Ground rules for the session barred use of the official's name.

He estimated it would take about $20 billion over the next five years to strengthen the U.S. command and control system and ensure that the president, the secretary of defense and top military leaders could communicate without interruption with missile bases, submerged submarines and other key forces.

"We have been remiss for a long time in not paying attention to command, control and communications," the official said.

The official said the Soviets were aware of U.S. vulnerability.

According to the official, the Soviets could black out U.S. communications with a few nuclear bursts through a phenomenon called electromagnetic pulse.

This phenomenon, well-known for about 20 years, is called EMP. It has been defined by the Defense Department as "a burst of electromagnetic energy radiating from a nuclear explosion, thereby creating a high-frequency electrical field similar to that created by thunderstorms."

The size of the area covered by such an electrical field, the Pentagon has said, depends on whether the nuclear explosion is within or above the atmosphere. Bursts above the atmosphere would create a strong electrical field covering an area nearly the size of the continental United States, the Pentagon has said.

The United States has built airborne command posts for the president and other senior officials and for commanders of the nation's nuclear striking forces—flying command centers in event of a threatened nuclear attack. However, the official indicated that the present state of communications equipment raises the possibility that these leaders might not be able to pass their orders to the nation's retaliatory forces because of disruption by Soviet nuclear blasts in or above the atmosphere.

Senator WARNER. Senator Dole?

Senator DOLE. I have no questions. I am very interested, I hope the committee staff will look over each of the 10 recommendations because he certainly had the practical experience. I think as he indicates, that is no criticism of the generals because sometimes the people on the scene who are doing it on a daily basis understand it better than somebody who only reads about it or occasionally visit the site.

Senator WARNER. That will be done, Senator Dole. Senator Exon.

Senator EXON. Thank you, Mr. Chairman.

Mr. Litsey, I just cannot tell you how much I appreciate your coming, especially under the circumstances. You gave us some very interesting testimony and we shall followup on it. I have been at SAC and received briefings from them. They said they cleared up all their problems and everything is fine. I do not know whether you have ever read the report of General Davis.

Mr. LITSEY. I have seen it, yes, sir.

Senator EXON. You obviously do not agree completely with it.

Mr. LITSEY. No, sir, I could not.

Senator EXON. I did appreciate your total testimony and also your indication that when and if we pull out these Titans, we should replace them one for one with the MX. That is something I agree with. So, we appreciate your testimony.

Thank you and good luck.

Senator **Warner**. Senator Levin?

Senator **Levin**. Thank you, Mr. Chairman.

Senator Dole asked something, I want to make sure I understand his question. Did you ask that his comments be sent to SAC and that then SAC be asked to respond to them because you raised some serious questions.

Senator **Dole**. I asked they be reviewed by staff. I assume in the process they would ask for a response from SAC.

Senator **Warner**. That is true.

Senator **Dole**. Because they are technical in nature and I did not understand them.

Senator **Levin**. I think that request of Senator Dole is right on the mark and I would agree.

[The information follows:]

RESPONSE TO MR. LITSEY'S PREPARED STATEMENT ON THE TITAN II

Taken at face value, Mr. Litsey's prepared statement seems to be a detailed and technical analysis of unresolved problems threatening the viability of the Titan II weapon system. Closer examination—particularly from the viewpoint of an operational commander—provides a different perspective.

In responding to Mr. Litsey's remarks I would like to make three main points:

First, some of his concerns are unfounded and misleading.

Second, many of the issues he raises are valid, but none is new or unexplored.

Third, the Titan II system is safe and supportable through the 1980s.

However well-intentioned, Mr. Litsey presents a distorted view of some very vital issues. For example, he gives the impression that unauthorized or inadvertent Titan launch is possible. It is my considered opinion, supported by extensive security studies, that this simply is not the case. The combination of a dedicated, professional crew force and hardware safeguards such as the Coded Switch System guarantees that a Titan launch will only take place upon lawful order from the President.

Mr. Litsey makes an unsupported statement that covert entry and sabotage of a Titan complex are "easily accomplished." Any attempted entry to the underground Launch Control Center or missile silo would be immediately detected and effectively dealt with.

Mr. Litsey raises the case of Lt. Cooke and implies, based on personal speculation, that our national security has been grievously and irreparably harmed. Further, he intimates that SAC has been unnecessarily secretive and lax in taking steps to insure that the operational integrity of our deterrent force is maintained. I can assure you we have thoroughly evaluated the potential damage resulting from Lt. Cooke's disclosures and taken every step necessary to maintain the viability of our strategic forces. We do not, as Mr. Litsey puts it, "roll the dice with national security."

Turning to my second point, Mr. Litsey presents a detailed evaluation of several potential safety problems facing the Titan system. Although some technical aspects of his statement are incorrect, I am impressed by the overall depth of his analysis. He is obviously well read. Rather than address his specific concerns I will move directly to the single salient point—every issue raised by Mr. Litsey has already been carefully evaluated in several Air Force investigative studies including the Titan II Weapons System Review Group Report of December 1980.

Following the two major accidents in 1978 and 1980, I headed a thorough study of the Titan II system. That study found that the system was viable through the end of the decade. To enhance system safety and supportability, the Air Force began priority implementation of over 200 recommended improvements following the 1980 accident.

Although missile age and condition had nothing to do with either major accident, there remains a widespread perception that the Titan is an obsolete and dangerous system. I can assure you that until the last Titan II missile is deactivated in 1987, we will continue to maintain required safety and operational standards. We fully recognize our responsibilities to national defense and to the safety of the public and the military personnel who must operate and maintain this system. This responsibility will not be compromised. If you have any further questions on this issue I will be happy to address them.

Senator **Warner**. Thank you, Mr. Litsey, you may be excused now to hopefully make your flight at a convenient time to get back to your family. We wish you well.

Mr. **Litsey**. Mr. Chairman, I appreciate it. I appreciate your forbearance on the fact that I was going into technicalities that you are not familiar with. Also, the fact is that I would have intended to go through the outline and have you ask questions coming back at me.

Senator **Warner**. Thank you very much. We wish your family the very best.

Mr. **Litsey**. Thank you. Thank you, General.

Senator **Warner**. General, we appreciate your forbearance and courtesy to the witness and the committee.

Now, we have had the benefit of your statement. It will be put in the record in its entirety. If you wish to proceed by summarizing this in some way?

STATEMENT OF GEN. RUSSELL DOUGHERTY, USAF (RETIRED), FORMER COMMANDER IN CHIEF, STRATEGIC AIR COMMAND

General **Dougherty**. I will do that, sir, it is short.

First I would like to make a comment on Mr. Litsey's testimony. One thing about all generals is that they have been captains. I have walked in his shoes in other operations systems, but not in his type shoes. I would respect his views with regard to missile duty and hope that they are conveyed to General Davis.

Senator **Warner**. What were you flying when you were a captain?

General **Dougherty**. A B-29, B-17.

You asked me to provide personal views on the plan of the Department of Defense to phase out Titan II's.

Senator Exon wrote me several weeks ago and asked for some of my general views because he and I have had a long association from my prior experience as Commander in Chief of the Strategic Air Command during the time that he was the Governor of Nebraska. We have maintained a friendship since then, with him and his staff. We have had an exchange of correspondence on this subject. With Senator Exon's concurrence I have given these letters to Committee Counsel.

The Titan II is important because—it is. It is operational, that is important. And it is capable—albeit a system of another generation, another time, another propulsion, another accuracy; but it is not yet replaced in our operational inventory.

I do not think I have to beat it to death with you gentlemen, operational inventory is not what might be or could be, but what is. That is where $500 million becomes significant to me because for $500 million, in light of a question asked during the closed session, you cannot buy that kind of system.

I have categorized three things that affect the Titan phaseout:

The ability and the expense of continuing to maintain it as a safe weapons system. With deference to Mr. Litsey, a lot of things have happened to the Titan since he left. If you look at the safety record of Titan, you have had two bad incidents that I know of but in a comparative sense with weapons of war, and particularly older weapons of war—I put in that category the B-52—that safety record has not been as abominable as it might have been.

The actual effect of removing the Titans on the overall strategic posture and the effect on aggregate weapons and megatonnage.

Then, the third thing, of course, is the implications of the Titan system on arms control.

There are others, but those are the three things into which I think the problem can be lumped.

The $500 million, spread out over really 6 years because it is going to start in 1982, is a major saving. It tails off toward the end, it is heavy on the front. That is important because that is where additional funds for vital starts and modernization need be. I appreciate that, as I am sure does this committee.

But the basic Titan costs are sunk. You spread this $500 million over, really, three things:

First, procurement—and that goes to the safety modifications that would have to be made and that would be made if the Titan were kept.

I have read the Davis report, he talked about it earlier. It is a very, very comprehensive report, very well scrubbed by people who are absolute experts in today's type weaponry, living with it from day to day. They may not be the same people that Mr. Litsey has talked to, but equally responsible.

Second, operational and maintenance expense, all of these are almost in the noise level, to use that Washington phrase.

But the third, the personnel costs, are the big ones. I have not seen the exact figures but I would be willing to bet that 85 percent of that $500 million goes for personnel costs.

But the training base is already established for those people, and it is a matter of just flowing them through to keep that up.

From common knowledge I would not categorize Titan II as unsafe. I think you are likely to have some measurable degree of hazard with that system, but it would be very, very low. With deference to those of you who have Titans in your State—and Senator Dole of Kansas just left—I share concern with those people. We did not have any Titan incidents during my 3 years as Commander in Chief of SAC—but we could have. We were all aware of that; any operational commander is.

The actual impact of Titan on the effectiveness of the operational inventory, of course, has to be discussed in closed session, but I think the total megatonnage it represents is significant. You all have mentioned it here in open session as 1 to 11 of the total inventory—I think that was mentioned by Senator Levin—and about 100 to 300 in regard to number of warheads. But, Titan has a big warhead and it puts at risk a lot of targets, even with its relative lack of accuracy.

It has a degree of vulnerability that nobody would want in a modern weapons system, but it exists, and its existence is important. Who knows how a war is going to start? I think that is important because the image of war that we hold is as variable as there are people who conjure up images of war. In sum, this weapons system plays a large part in influencing the calculations of war, particularly an escalating war when it sits there with a relative degree of readiness that cannot be ignored by an enemy.

Then, the warhead on the Titan is our largest. It has been my observation that many people talk about warheads as if warheads were just warheads, all alike. They are not. In my statement I said, "We must compare warheads to other warheads as we compare, cannonballs and BB's; and it takes a lot of BB's to make a cannonball."

It is true, as General Davis referred to in his open testimony, that the Titan is a weapon system of a bygone technology, and hopefully, a bygone era of military strategy on the part of this Nation. But it still exists.

If we have to give up Titan to get the strategic modernization that the President has recommended, then I would give up the Titan. If we do not have to give up the modernization to keep the Titan—and Senator Levin, you talked about the percentages—it makes good operational sense to me, for us to keep it.

Now, in my view, the arms control implications of Titan are really simple, but they are so subjective that they cannot be discussed in a conclusive sense by any one of us because others may not share the opinion. I do not know what Ed Rowny and Paul Nitze may have by way of quid pro quo from the Soviets, but if they do not have a quid pro quo in hand, and if we are making a unilateral decision to phase them out for $500 million of money, stretched over 6 years, then I think it would be a mistake.

But I hasten to say, I think it would be a worse mistake to take it away from the strategic modernization program the President is recommending.

If you can see your way to fund the retention of Titan II's without shorting the other strategic weapons modernization programs, then I would recommend to you that you do.

[The prepared statement of General Dougherty follows:]

PREPARED STATEMENT OF RUSSELL E. DOUGHERTY, GENERAL, USAF (RETIRED)

Mr. Chairman, members of the Strategic Subcommittee of the Senate Armed Services Committee, I am honored that you would invite me to participate in your deliberations.

You have asked me to provide my personal views concerning the Department of Defense's plan to phase out the Titan II ICBM system in the inventory of Strategic Air Command, which I was privileged to command during the period 1974-1977. As I understand it, the phase out of 52 Titan IIs would be relatively evenly divided over the five year period of fiscal year 1983 through fiscal year 1987.

Senator Exon wrote me several weeks ago and asked my general views on this subject, expressing serious concern that unilateral retirement of this weapons system—without comparable phasing out of Soviet strategic systems—would do us disservice in both preception and fact. I replied to Senator Exon on February 12, 1982. I request that a copy of this exchange of correspondence be circulated to the Committee and placed in the record as an expression of my overall views in this manner and as my response to the specific questions Senator Exon put to me.

The Titan II system is important because it exists—it is operational—it is important to our strategic inventory—it is capable (albeit lacking modern weapons' efficiency)—and it is not yet replaced within our operational inventory.

(I will continue to emphasize operational inventory, Mr. Chairman, to distinguish between those strategic weapons that might be, may be, will be—but aren't yet "on line" with combat crews in our combat commands or incorporated in actual combat planning. There is a big difference—often overlooked or misunderstood!)

To me, as a very interested observer of this overall program, the questions concerning the removal of the Titan II ICBM's from SAC's operational inventory fall into several general categories, i.e.:

a. The ability and expense of continuing to support and maintain the expected mission effectiveness of the Titan II ICBMs.

b. The actual effect of the removal of the Titan IIs from SAC's operational inventory on overall U.S. strategic nuclear posture; particularly, the effect on the aggregate weapons and megatonnage relationship to that of the Soviet Union.

c. The arms control implications of withdrawing the bulk of the Titan IIs from the ICBM inventory prior to their replacement by the planned deployment of the modern, improved MX (which, I understand, should achieve initial operational capability with the first of this new series of ICBMs in late 1986, just before the planned retirement of the final increment of Titan IIs).

Obviously, there are other peripheral implications; however, I think these three areas are of most concern to you in your deliberations.

I will talk to each of these three categories. First the supporting concerns:

It is my understanding that the fiscal savings achieved by Titan II deactivation run to about $500 million—spread out over the six years, or so—starting in fiscal year 1982. The major savings are, of course, in the earlier years with a decided falling off toward the end of that period. Obviously, this front-end saving is important to those seeking additional funds for vital starts on essential modernization programs in the near term. None of us can be insensitive to this.

The basic Titan II costs are sunk; consequently, these $500 millions must be spread throughout procurement (which I would think minimal, and oriented primarily toward some safety-related modifications that were recommended following the 1980 Titan II incident in Arkansas); operational expenses and other routine system maintenance costs (still relatively inconsequential, albeit important); and the personnel costs for Titan II associated crew and support personnel (and I would be surprised if these didn't make up from 80 to 90 percent of the $500 million).

From common knowledge shared among those of us with pointed interest and concern, some of the desirable safety modifications coming out of the 1980 investigating board (which, incidentally, the present CINCSAC headed) should be made if the system is retained. While I would not categorize Titan II as inherently unsafe (witness its relative safety record) it is a system that must be respected, handled with deserved respect and care, and its crew and supporting disciplines are crucial. But this is so with many military systems and should not be controlling,

Turning now to the actual effect on removal of the Titan IIs from the operational inventory:

Obviously, you will need to get the specifics from DOD witnesses in classified testimony, but it is well known that the 52 large single warheads of the Titan II missiles make up a far greater percentage of the total operational megatonnage in our US inventory than does the percentage of single warheaded TITAN IIs bear to the total number of warheads in our operational inventory. But—Titan warheads, are big—and most all others are much, much smaller. Such 52 large warheads, though launched with less accuracies and by aging and obsolescing missiles, cannot accurately be shunted aside as inconsequential, for they are not.

Undoubtedly, the introduction of modern operational air launched cruise missiles, the vitally important B-1, and (hopefully) improved theater nuclear forces will help offset the potential of Titan II reductions, but the size of Titan II warheads enables a very large number of legitimate military targets to be placed at risk. To cover these targets adequately without the Titan IIs will require hundreds of these smaller warheads.

In short, a "warhead is not just a warhead". There is as much difference in the size of warheads as there is between cannonballs and BBs—and it takes lots of BBs to make up a cannon ball.

On the other hand, as many of this Committee will recall, I have always urged our decision makers—in the administrations and in the Congress—to recognize that our older weapons systems (and the Titan IIs are among these) were creatures of by-gone technology and by-gone strategic thought. Measured in weapons efficiency, the Titan II won't measure up to the modern capabilities and efficiency that we could have had in our operational inventory, or that we will have with the President's strategic improvement program; nor are the Titan IIs as efficient as our more modern systems in modern strategic planning.

If we have to give up the Titan IIs to get the modernization that the President has recommended, then we can and should. If we can still modernize without stops and starts or gaps, and still retain the Titan II's until our MXs are up and operational, I think we should. It makes good operational sense to do so.

The arms control implications are really very simple—but very subjective. I am not privy to other than public and open information, so I do not know of anything that Paul Nitze of Ed Rowny may have achieved by way of quid-pro-quos. But, in the absence of such it is my view that a unilateral decision by us to phase our Titan IIs, for a cost saving that I estimate to be no more than $500 million over 6 years, is a mistake. But it would be a worse mistake to take $500 million away from either the B-1 or the MX. Therein lies the dilemma.

If Congress can fund for retention of all 52 Titan IIs through fiscal year 1987, without shorting the other strategic weapons modernization programs, I'd recommend you do it.

Senator WARNER. General, that is very clear. We appreciate, as members of the subcommittee, your appearance here.

I was struck by one statement, and I am going to check, and that is on your thought of the $500 million, 70 percent are personnel costs?

General DOUGHERTY. I would say it is something like 80 percent. I do not know, Senator, but I would be willing to bet my reputation that it is in the vicinity of 80 percent.

Senator WARNER. Well, that would not generate a saving because the same personnel would probably be transferred to other duties within the Air Force.

General DOUGHERTY. That is a consideration. I do not know what would happen.

Senator WARNER. But you are inferring that maybe of the $500 million in potential savings alluded to earlier there are only $100 million which would actually be realized?

General DOUGHERTY. I can put that question to the Air Force and get you an answer.

Senator WARNER. We will do that, that is our responsibility. I think it is an important one.

General DOUGHERTY. It is important to me, too.

Senator WARNER. I will see that fact will be put in the record.

[The information follows:]

TITAN RETIREMENT

Question. How much of the approximately $500 million savings in the retirement of the Titan II system can be attributed to personnel?

Answer. Approximately 20 percent of the cost avoidance in retiring the Titan II system can be attributed to personnel. Approximately 60 percent of the cost avoidance relates to planned modifications that will not be performed. The remaining 20 percent can be related to Operation and Maintenance costs.

Question. Will the same personnel be transferred to other duties within the Air Force?

Answer. Yes, personnel will be transferred to other duties within the Air Force.

Senator WARNER. Senator Exon?

Senator EXON. Thank you, Mr. Chairman.

Thank you, General, for your concise, clear statement. I just have two or three questions I would like to put to you to follow up for the record to try and put this in proper perspective.

In the first place you, I think, were here and heard the testimony about the fact that we will take the Titans out of their silos beginning next October at the rate of one a month. Then they are going to be stored someplace, and there was at least some attempt made that, "But, we are not doing away with them, we could actually bring them back and put them in the holes."

Again, I am not a technician but I would expect with all the danger that we have with that liquid propellant, in addition to just the logistics of doing that, would there not be a very difficult time with getting the liquid propellant and putting it back in?

Do you generally agree with the statement that once they are out we had better forget them as a viable weapons system?

General DOUGHERTY. I do, Senator. I do not know exactly how they would be handled nor what the plan is. But this weapons system is safe only because it is all up and operational right now. The minute you start removing the focus from the weapons system, then it becomes a second-class citizen and it goes into some state of disassembly. Even if it goes only to removal and down load of the fuel and hauling the fuel away, you are going to have one hell of a time getting it back.

Senator EXON. Now, let us go to the perspective of the Soviet planner. As you know, all during the time that you were commander of SAC and before that in your other important assignments in your distinguished military career, you played war games—that was part of the job that you had and that is part of the job that we have here. It is a very deadly game and a very serious one.

But from the standpoint of Soviet planners—I always try and say, you know, what is the other side thinking about? What are they doing, and how are they going to interpret the actions that we might take?

I asked a question in closed session. I would like to ask you this question now. From our planning standpoint—and I will get to their planning standpoint in a moment—if we knew that the Soviet Union was going to strike us in 1985 sometime in December, let us say December 7, 1985, would you not recommend that certainly we not take out any of the Titans now, that indeed we should continue to build up as has been suggested to us?

I am talking about this "window of vulnerability" area that many of us have been concerned about for a long time.

General DOUGHERTY. Sir, if I knew that the Soviets were going to strike us in 1985, I certainly would not degrade a single weapons system we have. In fact, I would pull out all stops and constraints and urge this Congress to provide more.

This goes back to my concern about the $500 million. I recognize the importance of that money with regard to modernization but to translate $500 million into an operational weapons system, even one that is aging and to many extents obsolete, I think this has to be weighed very carefully. I am sure the Department of Defense has weighed it.

But from my perspective, if it is possible for this nation to preserve those older systems while they are bringing on needed strategic modernization, it makes good sense to do so. It makes manifest good sense if I know there was going to be a war in 1985.

Senator EXON. I guess I cannot buy how we could spend our defense money any better, assuming that we were relatively and reasonably safe for a total of $100 million a year for 5 years, not $500 million a year. It just seems to me, I do not know how we could spend money any better when we know and recognize now that they represent—those Titans—somewhere between 25 percent of our total megatonnage and about 33 percent of our land-based megatonnage.

Now, that leads me into the final question I have. I do not know what has happened on overall strategy and deterrent from our standpoint. But it seems to me, while I recognize that that Titan is not the most accurate of missiles, if we were a Soviet planner and we thought that they might just lob one or two of those at Moscow, I suspect that the accuracy of the missile would not be their major concern. Do you agree?

General DOUGHERTY. Yes, sir. It is a weapon that, by the technology of the present time has a low order of accuracy, and that was one of the reasons that we have a high order of yield in its warhead—to compensate for the lack of accuracy.

It is a weapon that is optimized against soft targets, targets around a factory, a plant, a city. It is not a hard-target weapon. Though, it is going to be a very hard target weapon for anything located directly under its ground zero.

Senator EXON. Very hard.

General DOUGHERTY. It cannot be planned as a hard-target weapon because of its accuracy.

Senator EXON. General, I thank you. Those are all of my questions.

Senator WARNER. Senator Levin?

Senator LEVIN. Thank you, Mr. Chairman.

RUSSIANS AHEAD IN MEGATONAGE

The Russians are ahead of us in megatonnage, is that true?

General DOUGHERTY. I think that is common knowledge, sir; it is my information.

Senator LEVIN. Would you agree that megatonnage is at least one measure of a number of measure of strategic nuclear capability?

General DOUGHERTY. Yes, sir. It is very easy to oversimplify this but, to a point, accuracy can be thought of as about a four as to megatonnage being about a one. A four to one ratio. But there is a limit. Absolute accuracy and no megatonnage, of course, is useless.

But I think the general trade-off between accuracy and megatonnage is something like four to one or three to one.

Senator LEVIN. All right, so that megatonnage can be overrated, but at least it is one measure of nuclear capability.

General DOUGHERTY. Yes, sir. To a point, it compensates for inaccuracy.

Senator LEVIN. We have a nuclear modernization program that has been proposed, and its cost is $180 billion. If we could keep the Titans it would cost us $180.5 billion. What is your reaction to those figures in terms of relative value?

General DOUGHERTY. If Congress is disposed to do that, I think that 0.5 billion in keeping Titan would be a wise investment.

Senator LEVIN. What does it add, one-half a billion dollars to the $180 billion bill?

General DOUGHERTY. I said I think that would be a wise investment. It would certainly give you an opportunity to have some unexpected slips, stops and starts in that $180 billion strategic modernization program. It has been my experience that there will be slips; that is the way weapons systems developments go.

Senator LEVIN. Could you give us some idea of relative values? For instance, if we could save $10 billion or $20 billion, or $50 billion by getting rid of the Titans, how much would it be worth?

General DOUGHERTY. I do not know how to answer this. But I certainly do not think that you should preserve this system if there were a $10 billion system cost, because of the traumatic impact it would make on modernization.

Senator LEVIN. On modernization.

General DOUGHERTY. Yes, sir.

Senator LEVIN. And then it might not be worth relatively the $10 billion?

General DOUGHERTY. In my judgment it would not be in today's environment. But that is a subjective judgment.

Senator LEVIN. I understand. I am trying to get an idea as to its relative value because I think that is important.

General DOUGHERTY. You must haggle over the price here, and I understand that.

Senator LEVIN. But there is no doubt in your mind that it is worth one-half a billion to retain the Titan II missiles?

General DOUGHERTY. In my mind there is no doubt, with the cost at $500 million over a 6-year period.

Senator LEVIN. Thank you.

Senator WARNER. Did I understand correctly that you would not be in favor of retaining the Titan missiles if the consequence would be a degradation of the modernization program?

General DOUGHERTY. Yes, sir. If this were to interrupt or interfere seriously with the President's strategic modernization recommendations I would not be in favor of it because I find them all very essential and what I term to be of highest priority in the national interest.

Senator WARNER. We thank you very much for your offer to come down today. I would like to thank you for your testimony.

I know that my colleagues have a continuing very high regard for your professional views and we miss you.

General DOUGHERTY. And I for them, sir. Thank you very much.

Senator WARNER. I hope you will come back.

Gentlemen, we have some questions which we will submit to be answered for the hearing record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

TITAN II CONTRIBUTION

Senator WARNER. General Davis, from a targeting point of view, do you agree that the reduction in megatonnage represented by the withdrawal of the Titans is not—given the offsetting steps being planned by the administration (MX, interim program, Minuteman III additional deployments) and considering the capability of the Titans to attack effectively the required targets—a significant degradation of our strategic capabilities?

General DAVIS. Under the conditions you have given, Senator Warner, I would agree that the planned gradual deactivation of the Titan II will [deleted]. However, I want to make clear that I do not regard the Titan contribution to [deleted]. As I noted in my testimony, Titan II accuracy [deleted].

My agreement with your statement is based on implementation of the planned strategic modernization program, to include a replacement of 50 MMII with MMIII, 10 MX in 1986, and the addition of over 1400 ALCM weapons to the inventory. Under these conditions, loss of Titan II will be [deleted].

TITAN IN THE SHOP

Senator WARNER. General Davis, Mr. T. K. Jones told this subcommittee several days ago that the contribution the Titan II missiles made to our overall strategic capability was quite limited. This calculation seems to be predicated upon a conclusion that the post-strike survivability of this weapon system is sufficiently small that, when combined with its limited utility against the current SIOP target base, its retirement does not significantly degrade our strategic capability. Do you agree?

General DAVIS. Under current conditions, I find the Titan II quite useful in SIOP planning due to its ability to [deleted]. I agree that it is not as survivable as some other systems. However, since we plan to employ most of them [deleted]. I agree that it is not as survivable as some other systems. However, since we plan to employ most of them [deleted].

Even though the Titan II accuracy [deleted] would be required to achieve equivalent damage. Without deployment of additional weapons through force modernization, retirement of Titan II [deleted]. However, as I stated in my answer to the previous question, the loss of the Titan II should be more than offset by our planned strategic force modernization program.

TITAN AS A START BARGAINING CHIP

Senator WARNER. General Davis, what, in your professional judgment, are the prospects that the United States can achieve concessions from the Soviet Union at the Strategic Arms Reduction Talks in exchange for deferring further the retirement of the Titan II missile?

General DAVIS. Senator, I believe there is little quid pro quo value in the Titan II system for START negotiations. As I stated before, Titan retirement has been under consideration for several years. The Soviets are aware of this just as, I'm sure, they are well aware of the system's capabilities, vulnerabilities and age.

TITAN AND SALT II NEGOTIATIONS

Senator WARNER. What was the history of our attempting to do so in the SALT I context?

General DAVIS. I would respectfully defer this question to the State Department. I have never been privy to the SALT I treaty negotiating records, and I believe the Arms Control Disarmament Agency could more adequately respond to your question.

COMPARISON OF UNITED STATES/SOVIET CAPABILITY

Senator WARNER. General Davis, after we met earlier this week questions were raised by our colleague, Senator Nunn, about obtaining from the Strategic Air Command, data comparable to that provided by General Ellis in previous testimony. This data compares Soviet and United States strategic capabilities in a number of key criteria including residual weapons and military damage expectancy.

I recognize that you did provide such a comparison in your testimony before the committee in the fall of 1981. Have the calculations you made in November 1981 changed and whether they have or not, will you submit your current projections, so that the record of these hearings may be complete?

General DAVIS. Senator Warner, with the exception of very minor changes in the planned Reagan force structure, our assessment of relative United States and Soviet warfighting capabilities has not changed from the balance I depicted during testimony in November 81. I would like to point out that the analysis was based on the dated strategic doctrine reflected in PD 18. We are currently updating our analysis to capture the latest targeting guidance. This is an extensive effort requiring modification of our analytical model and the supporting data base. This process is still underway and we will be happy to provide the information as soon as it is available. Because our assessment of the projected balance is essentially unchanged, I will review the significant results of the analysis I presented in November 81.

In mid-1977 there was essential equivalence with an approximate [deleted] capability for [deleted]. Our overall strategic position was projected to remain sound throughout the decade with the 1977 planned force. Later, however, due to significant improvements in Soviet offensive capabilities and the cancellation and delay of key United States strategic programs, a window of vulnerability opened through the decade. A comparison of current 1981 alert forces shows US and USSR MDE at [deleted].

Comparing the Carter and Reagan strategic forces in 1990 shows that they are relatively equal in terms of MDE. The USSR will have a residual weapon advantage against either force after a counterforce exchange. However, the USSR will have approximately [deleted].

I have asked Maj. Gen. Hecker, SAF/LL to forward a copy of the November analysis to complete the record. (The analysis is classified and retained in committee files.)

TITAN VERSUS MODERNIZATION

Senator **Warner**. General Davis, do you, in your professional judgment believe that the Administration is correct in deciding to expend the funds which would otherwise be required to support and maintain the Titans on other, higher priority program? Is you own assignment of priorities such that you concur with the administration in expending funds on modernizing the strategic forces, even if doing so means retiring older systems?

General **Davis**. As I have stated previously sir, given unlimited resources, I would prefer to keep existing systems online until our force modernization programs come to fruition. Unfortunately, in the world of reality sacrifices must sometimes be made.

In my professional judgment, the planned weapon system retirements will not jeopardize our deterrent posture providing we maintain the currently projected modernization schedules.

THE IMPACT OF INTERIM MX DEPLOYMENT ON SOVIET PERCEPTIONS

Senator **Warner**. General Davis, would you provide to the Committee your views on the degree to which the deployment of MX missiles in non-superhardened Minuteman silos as proposed by President Reagan would provide a greater incentive to a Soviet preemptive attack rather than a deterrent to such an attack?

General **Davis**. I do not believe MX deployment in Minuteman silos will give the Soviets an increased incentive to attempt a preemptive strike. As long as the other two legs of the Triad—the bombers and SLBMs—remain survivable, the Soviets will face nearly insurmountable problems in timing a strike that could destroy all the forces of our Triad, including the ICBMs. Furthermore, although we will not rely on launch under attack as our sole policy for ICBM execution, the Soviets must still reckon with the possibility that we could launch our ICBMs before their preemptive strike has had its full effect. In such an event, the very accurate MX weapons would add significantly to our prompt counterforce capability, thus increasing the cost to the Soviets of any attempted attack on the US. Taken from this perspective, MX in Minuteman silos will significantly bolster our deterrent posture.

INTERIM MX DEPLOYMENT AND THE STRATEGIC BALANCE

Senator **Warner**. Do you regard the President's interim plan as a destabilizing step or one designed to promote stability in the strategic balance?

General **Davis**. President Reagan's interim plan for basing MX will enhance stability through improvements to our warfighting capability. MX in silos will place the Soviet superhardened ICBMs at risk. By being able to credibly threaten the USSR's residual nuclear forces, we significantly raise his cost to attack us, and thus improve deterrence. In addition to a credible warfighting capability, deterrence is a function of a demonstrated national resolve to employ our weapons consistent with US objectives. Deployment of MX serves both purposes: the investment demonstrates our resolve, and the MX weapon system enhances our counterforce warfighting capabilities.

THE IMPACT OF RETROFITTING THE MINUTEMAN III FORCE WITH AIRS

Senator **Warner**. Would the retrofitting of the entire Minuteman III force with the AIRS guidance system and MARK 12-A warheads do more or less to destabilize the strategic balance, in your opinion, than would the President's interim basing scheme for the MX?

General **Davis**. As I indicated in my answer to a previous question, any improvement to our ICBM counterforce capability by making them more effective against hardened Soviet targets—such as ICBM silos—should not be considered destabilizing. By being able to credibly threaten destruction of the USSR's residual nuclear weapons following an attack, we significantly raise the cost of such an attack, thereby enhancing deterrence. A truly destabilizing situation would be to allow our strategic nuclear capabilities to degrade to the point where the USSR believed they could attack us with little threat of retaliation.

THE STRATEGY-FORCE MISMATCH

Senator **Warner**. General Davis, I think the point you have made in your statement concerning the mismatch between national guidance and strategic forces in the inventory is an extremely important one. Would you amplify for the Committee on the degree to which the President's strategic force modernization plan represents a significant enhancement of our capability to execute the strategic guidance?

General **Davis**. President Reagan's strategic force modernization plan will make comprehensive improvements in our forces and C^3I over the next several years. Completion of the entire modernization plan in the mid-1990s will include the B–1B, the ATB, the MX in a survivable basing mode, the Trident submarine with the D–5 SLBM, a comprehensive overhaul of our strategic C^3I system, and other initiatives which will improve our force management and support capabilities. At its completion, this plan will have essentially corrected the strategy-force mismatch by providing us with forces possessing the requisite survivability and warfighting capability to meet national strategy.

TITAN RETENTION REQUIREMENTS

Senator **Warner**. General Davis, what specific additional steps do you believe would be required to further enhance the safety of the Titan missile system if a decision were made to retain them indefinitely in the inventory?

General **Davis**. The extensive studies completed after the accident in September 1980 identified a series of improvements required to make the Titan system safe and supportable through the 1990s. Many have already been completed or in process. Others were dropped after the deactivation decision because they were time consuming and not cost-effective given that decision. These would need to be pursued if Titan were to be retained. They include:

(1) New Missile Procedures Trainer.
(2) Launch Control System Electronics Upgrade.
(3) New Silo Vapor Detection System.
(4) Fixed Piping for Mineral Oil Insertion at each Missile Site.
(5) Negative Propellant Tank Pressure Relief Valve.
(6) Titan Missile Overhaul Program.
(7) Additional Propellant Transfer System Trainers.
(8) New Rocket Fuel Handlers Clothing Outfit.
(9) Safety Upgrade Modifications to the W–53 Warhead.
(10) Stockpile Titan III Missile Parts (before the Titan III production line is shut down).
(11) Enhanced Weather Equipment at each Missile Site. In addition to these major items, we could probably expect to replace or overhaul some of the support equipment in the silos, such as water piping and air conditioning. We would also have to improve Titan communications over the next few years to insure compatibility with other strategic weapons systems.

COST OF TITAN IMPROVEMENTS

Senator **Warner**. What would the cost of such additional improvements be, in your opinion, over the next ten years?

General **Davis**. By current estimates, the additional improvements would cost about $122 million over the next five years. This figure includes neither the $30 million Command Control Communications upgrades that may be necessary if the system is retained past the late 1980s, nor routine upgrade or overhaul of silo support equipment that may be needed. The $122 million would be spread over five or six years—about $20 to $24 million per year—leading to a total annual Titan II system budget of about $135 to $140 million. This compares to an annual budget of about $155 million in the recent past.

SAFETY IMPROVEMENTS

Senator **Warner**. General Davis, describe in as much detail as possible, the safety improvements that have been implemented in the Titan II system since you completed your report on this aspect of the program in December 1980?

General DAVIS. Senator Warner, we have taken both hardware and non-hardware actions to improve the safety of the Titan II system. Among the important hardware changes are:

(1) Warning sirens have been installed at each missile site.

(2) Mineral oil tanks have been installed at three sites in Arizona where the population has spread to areas near the missile to provide immediate vapor suppression capability. A tanker truck is available at each wing to cover the other less time-sensitive sites.

(3) Special donut-shaped dropcloths are now in use to prevent dropped objects from causing damage to the missile.

(4) Emergency Notification Team (ENT) vehicles equipped with radios, sirens, and public address systems now accompany each propellant convoy to enhance civilian warning or evacuation.

(5) Speed dialing phones have been installed in each Titan Wing Command Post and names and phone numbers for residents around each Titan site have been compiled.

(6) ENT vehicles are now on site during propellant operations.

(7) Upgraded radio systems have been installed in each Titan launch control center to improve crew communication and reaction to emergency situations.

(8) All tools used in the launch duct have been evaluated, unnecessarily heavy tools have been redesigned or replaced, and effective restraint lanyards are now used to prevent dropped tools from causing damage.

Non-hardware actions include the following:

(1) Pay incentives to improve retention of experienced propellant transfer technicians have been implemented. Reenlistment bonus has increased retention of first term airman from 17 percent in fiscal year 1980 to 67 percent in fiscal year 1981.

(2) Detailed public education programs have been implemented to improve communication with residents in the vicinity of Titan sites.

(3) Many technical orders and maintenance procedures have been clarified or expanded to make them more useful in emergency situations.

(4) Maintenance supervision has been increased, especially during propellant operations and maintenance inside the launch duct.

(5) Several studies have been conducted to improve actions to contain, neutralize or cleanup propellant spills.

(6) Elaborate civilian notification and evacuation procedures have been implemented in coordination with local and state offices of emergency services.

(7) Funding initiatives have been successful in securing adequate budget levels to support the Titan Air Logistic Center's efforts, especially in service engineering.

TITAN SAFETY AND SUSTAINABILITY

Senator WARNER. Do you believe these missiles will remain safe, as a result of the steps we have taken in the past, such that we can confidently keep parts of the Titan force awaiting retirement in their holes for the next few years?

General DAVIS. As I indicated in my statement, many of the safety modifications recommended after the September 1980 accident have already been completed or are underway. We are concentrating now on the measures that will promote safe deactivation. This, coupled with use of spare parts from dismantled missiles to support those still on alert will insure that the deactivation proceeds in a safe and controlled manner while active missiles remain operational. SAC and AFLC, with Air Staff support, are preparing a detailed deactivation plan to make sure no safety factors are overlooked during the drawdown.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

ADDITIONAL MM III

Senator LEVIN. General Davis, your SECRET statement says that [deleted]. You also state that the phaseout of the Titans will be offset by other aspects of the strategic modernization program:

Substitution of 50 Minuteman III for 50 MM II net +100 RVs
First flight of [deleted] MX become operational [deleted] RVs
Addition of more than [deleted] ALCM to bombers [deleted] RVs

You state that the net gain is some [deleted] warheads, considering everything, when the Titans are deactivated.

Is it not true that the Minuteman III addition was first suggested by Congress?

General **Davis**. The current plan to deploy 50 additional Minuteman III was primarily a Congressional initiative. Air Force had suggested continued production and deployment at Malmstrom following completion of the first squadron there in 1975, but the plan was disapproved.

MX SCHEDULE

Senator **Levin**. Is it not true that the [deleted] MX would have been deployed under the Carter plan?

General **Davis**. The planned schedule for missile deployment was basically the same under the Carter plan. Of course, we do have somewhat higher confidence of meeting that schedule under the current plan because MPS construction is not involved.

ALCM NUMBERS

Senator **Levin**. Is it not true that under the Carter program, there would have been some [deleted] ALCM's deployed, instead of the [deleted] under the present program? According to the Library of Congress's special statistical summary of the Carter program, this is the case.

General **Davis**. Senator Levin, the Carter program did not include the B-1B and the associated penetrator weapons and therefore relied heavily on the number of ALCM in the force. Your numbers are approximately correct.

CARTER VERSUS REAGAN FORCES

Senator **Levin**. Thus, can't one conclude that there actually is a net decrease in the Reagan program in terms of weapons, as well as megatonnage, compared to the Carter program, and that any additions to the forces cited by you in your statement during the period of the Titan reactivation actually were already planned either by Carter or suggested by Congress?

General **Davis**. Senator Levin, my point was not to compare the Reagan and Carter strategic programs, but to demonstrate that the Titan retirement is more than offset by planned additions to the force. This would be the case under either the Carter or Reagan program.

OFFSET FOR TITAN

Senator **Levin**. How can you claim that the Titans will be offset?

General **Davis**. I can only repeat the numbers you have quoted. There will be a net addition of over [deleted] weapons to the inventory during the Titan II phaseout. In addition, the new weapons have smaller yields and are much more accurate, [deleted].

TARGET COVERAGE

Senator **Levin**. Have any of the [deleted] you mentioned now been left uncovered because of the Titan phaseout during any of the period of the phaseout?

General **Davis**. As each Titan II is removed, measures will be taken to target all important installations with smaller, more accurate weapons. With the current schedule for Minuteman II conversions to Minuteman III, and deployment of ALCM and MX, no important installations should go uncovered.

Questions Submitted by Senator Strom Thurmond

WINDOW OF VULNERABILITY

Senator **Thurmond**. General Davis, as the Titan II missiles are retired and the MX missiles are phased in, will the "window of vulnerability" open wider as General Allen stated?

General **Davis**. Our analyses indicate that retirement of the Titan II does not make a notable difference in our overall capability. As I indicated in my statement, the retirement extends over five years, and during that period over [deleted] new weapons enter the inventory. These new weapons are more compatible with current guidance and more than offset the loss of the Titan. As an operational commander, I would have preferred to retain them, but I do not believe retiring them substantially reduces the nation's security.

MX CAPABILITY VERSUS TITAN CAPABILITY

Senator **Thurmond**. Would you explain the difference in target kill capability between MX and the Titan II missiles?

General **Davis**. The two missiles were designed to support quite different strategies and therefore have very different target kill capabilities.

The Titan II was designed at a time when the United States possesses a marked nuclear superiority, and the assured ability to destroy a large portion of Soviet society was viewed as the most credible deterrent to both nuclear and conventional war. The Titan II's massive yield and poor accuracy tied in well with a strategy of massive retaliation—accuracy and discrimination were neither necessary nor possible. The Titan II was, and remains, a highly effective weapon for use against a collection of targets that can all be damaged by a single, high yield weapon.

Today's deterrent strategy calls for [deleted].

Its excellent accuracy and moderate yield make it effective against the broad spectrum of enemy military targets while limiting collateral damage.

Although a single MX warhead [deleted].

MK12A DEBATE

Senator **Thurmond**. General Davis, during the inhouse debate at the Department of Defense over the Mark 12-A warhead, what was your position and why?

General **Davis**. SAC has consistently advocated deploying the ABRV on the MX for several reasons. Most importantly, it provides the potential for an increase in yield to [deleted]. It will thus improve our capability against Soviet hard targets and provide a hedge against failure of the MX to meet its design accuracy goal of [deleted] feet.

Furthermore, the ABRV will be as modern as the MX booster, incorporating the latest advances in RV and fusing technology as well as enhanced nuclear safety features. It is also a more efficient user of scarce special nuclear materials.

MX BASING

Senator **Thurmond**. General Davis, at the present, which basing mode for MX do you favor?

General **Davis**. Senator Thurmond, I support the President's phased, two-step approach for MX deployment. Interim basing in existing Minuteman silos will provide a badly needed near-term increase in our prompt warfighting capability. Long-term basing will preserve for us the invaluable characteristics of the land-based ICBM.

Because in-depth studies of potential long-term basing modes are currently underway, I am unable to recommend a specific basing mode or combination of modes at this time. However, I am confident that we will find an acceptable solution to the ICBM survivability problem.

Senator **Warner**. We thank you for coming gentlemen. The hearing is now adjourned.

[Whereupon, at 5:15 p.m. the subcommittee adjourned, to reconvene subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

MONDAY, MARCH 1, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

THEATER NUCLEAR FORCES OVERVIEW

The subcommittee met, in open session, at 9:33 a.m., in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner and Goldwater.

Staff present: Frank J. Gaffney, professional staff member; Francis J. Sullivan, minority staff director; Paul C. Besozzi, minority counsel; Patrick L. Renehan, professional staff member; Drew A. Harker, research assistant; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon; Arnold Punaro, assistant to Senator Nunn; Greg Pallas, assistant to Senator Exon; and Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator **WARNER**. The Subcommittee on Strategic and Theater Nuclear Forces will reconvene this morning for a rather lengthy session.

It is indeed our privilege to have as our leadoff witness Gen. Bernard Rogers, Commander in Chief, U.S. European Command, a man who is held in the highest esteem and respect here in the Halls of the Congress, particularly by the Committee on the Armed Services.

General Rogers, it has been the policy of the chairman and myself and other members of the subcommittee to try to hold part of each hearing in open session, the reason being that we feel that it is important that the public learn as much as possible about the threat confronting the United States and its allies and the need to support increased defense spending.

I recognize that much of what you have to say are matters of a classified nature and we will go into executive session, but I would be very grateful if you could address the subcommittee about the threat as you perceive it today and how it was a year ago, and in particular how that relates to the theater nuclear forces situation.

First, I will call on my colleague, Senator Goldwater, for any opening comments.

Senator GOLDWATER. It is a great pleasure to have the General here. He is one of our best.

General ROGERS. Thank you.

Senator WARNER. All right, General Rogers.

STATEMENT OF GEN. BERNARD W. ROGERS, COMMANDER IN CHIEF, U.S. EUROPEAN COMMAND

General ROGERS. Thank you, Mr. Chairman, and thank you, Senator Goldwater. It is a pleasure to be back with this committee, Mr. Chairman.

Before I begin I would like to just say to you how much we appreciate your visit this past year and visits of other members of this committee to European Command as well as to Allied Command Europe.

I do not have a prepared statement for the record, but I do want to talk about theater nuclear forces. In compliance with your desire to keep the session open, I will modify some of the comments I had planned to make. In view of some of the people that are present here in the hearing room today, I don't think that I wish for them to hear some of the things I want to say.

Senator WARNER. Well, General, I have always had a view, as I said earlier, that we have to share with the general public. As you well know, one of the most fundamental principles of our society is that we are an open society. So whether they are here or not, I have always felt is rather inconsequential because anyone that is not here has access to the record and to the well-covered reporting of others who are present in the hearing room today.

General ROGERS. I do have figures with respect to initial operating capabilities and status of forces that I think should be the property only of the subcommittee and not of the general public.

Senator WARNER. General, I respect your wishes and certainly you know how to segregate what is appropriate.

General ROGERS. Yes, I will do that, Mr. Chairman.

THEATER NUCLEAR FORCE BALANCE

What I would like to talk about is the theater nuclear force balance and what happened in 1981 to impact upon it, and then the status of our modernization program to station the ground-launched cruise missiles and the Pershing II's in Europe.

With respect to the balance, the favor is toward the Warsaw Pact in quantitative measures at all ranges except less than 150 kilometers. That disparity runs from 3 to 1 to about 4½ to 1 for the Warsaw Pact for ranges greater than 150 kilometers. But for NATO we have about a 3 to 1 advantage for theater nuclear weapons with a range less than 150 kilometers.

Impacting on that balance is also the greater reliance that the Soviet Union has on missiles and rockets which gives the Warsaw

Pact advantages in penetrability, survivability, and reliability as well as in time urgent responsiveness.

With respect to what occurred in 1981 which impacts on the balance, the Soviet Union added an average of six SS-20 launchers per month. It fielded over 70 launchers last year. That results in an addition of over 200 warheads, not to include refires which double that number if the refire missiles are counted.

At the end of 1981 there were 30 operational sites, each site with 9 launchers, each launcher with a missile with 3 warheads and at each launcher a refire capability and another missile with 3 warheads. The number of operational sites has increased since the end of 1981 and we know the number that is under construction.

There has been in 1981 the continued deployment of the SS-21 and SS-22 and preparation to deploy the SSX-23, all replacing the FROG and the SCALEBOARD and the SCUD, and there was a continued production of the Backfire bomber at more than 25 last year.

With respect to NATO, the Alliance remained firm behind the December 1979 decision which was to modernize our long-range theater nuclear forces, at the same time walking down the parallel track of negotiating arms control measures to reduce and balance those forces.

In 1981 the Alliance defined and adopted the zero-level outcome as a guideline to be negotiated at the conference table. In 1981 those negotiations commenced on arms control measures for long-range theater nuclear forces. The deployment schedule of the ground-launched cruise missile and the Pershing II in 1981 remained generally on track.

IMPLEMENTATION OF THE MODERNIZATION PROGRAM

Now turning to the status of the implementation of the modernization program. In the United Kingdom at Greenham Common the construction started in February of 1981 and it is on schedule with the anticipated initial operating capability date still December 1983.

The United Kingdom will subsequently have another site for ground-launched cruise missiles at Molesworth, but its initial operating capability is later in this decade.

As far as Italy is concerned, she stands firm on her response to the decision in December 1979, namely, that she will accept the deployment of a certain number of ground-launched cruise missiles on her soil.

I would like to come back to the Italian situation subsequently in closed session, if I might. There is some information that I think would be useful to the committee.

With respect to Belgium, there has been a delay, as you are aware, in making the decision to accept the deployment of those weapons on her soil pending the results of the negotiations in Geneva. The Belgian Government has taken the position that it will review those negotiations every 6 months.

As a consequence there has been some slippage in meeting the initial operating capability date which I will discuss in closed session and some other facets of the Belgian situation I wish to discuss later on.

With respect to the Federal Republic of Germany, there is still no problem associated with the installations of the ground-launched cruise missiles on German soil, and Germany is still prepared to accept the stationing of the Pershing II's on her soil at a time which would coincide with the initial operating capability of the first GLCM's in the United Kingdom.

With respect to the Dutch, the Netherlands, there has been no decision made about accepting GLCM's on Dutch soil. As you know, she postponed making the decision in December 1979 for 2 years, and in December of last year opted not to make the decision one way or the other.

I am sure you have read that the Netherlands Minister of Defense has announced that there will be bilateral surveys authorized between U.S. personnel and Dutch personnel searching for sites. That is consistent with the position they have taken because in December 1979 you will recall it was a consensus agreement that we should modernize our forces. What the Dutch did was just to postpone the decision of deployment. They still have not made that decision, but that should not hamper our going ahead on the U.S. side with these surveys.

There is some political fragility associated with this modernization decision and its implementation, an item which I would prefer, Mr. Chairman, to discuss in closed session, if I might.

That completes the comments I wish to make on theater nuclear forces and I look forward to your questions.

Senator WARNER. Thank you very much.

General, we have seen press reports from West Germany suggesting that the Soviets have ceased the deployment of the SS-20 missiles in Eastern Europe. Your testimony this morning either omitted reference to that or it seems to be slightly at variance.

General ROGERS. I do not believe that is an accurate report, Mr. Chairman. The evidence available to me is that there may come a time when there will be a period of delay in the further deployment of the SS-20, but we do know, as I mentioned, and I will give you more of this in closed session, that there are sites being built and almost 100 percent of them are located in a position to threaten Western Europe. So I would anticipate the completion of those sites and it will bring it up to a total which I will give you later. Then there may be a hiatus during which time there may be no deployment.

I would just add a footnote to what I have said, namely, that the Soviet Union has exceeded the predictions we made just about a year ago as to the number of SS-20 sites that we anticipated she would make operational. We underestimated the number based on what has occurred since that time.

Senator WARNER. You refer of course to sites and I understand that. I think we should put in the record the analysis of sites and at the same time the mobility of this particular weapon system. It may have a mother base, but there is a good deal of flexibility around that base, is there not?

General ROGERS. You raise a very good point, Mr. Chairman, and I am glad you did.

The sites are permanent sites in which the missiles are stored in buildings which have roofs that open for inspection and to permit firing the weapon from that building. But they do have the transporter erector-launcher system with which they move the missile into the field and they are very adept at camouflage. We would anticipate seeing in conditions of anger, should that ever occur, the flushing of these SS–20's out of their operational sites and into the field. They are much more difficult, obviously, to locate and they can continue to move and it does not degrade their accuracy in moving them to the field site.

Senator WARNER. What are the approximate radiuses of that flushing action? In other words, what are the ranges that they can go, in your judgment, without degrading the accuracy and their ability to receive the logistical support from the site itself?

General ROGERS. I would like to provide that for the record, if I might.

[Information deleted.]

Senator WARNER. But it is fairly substantial.

General ROGERS. Well, it is, yes. And of course it is not unique with their system. We would intend to do the same thing with ours, as you know. I am talking about the ground-launched cruise missiles and making them a mobile system.

ONSITE INSPECTIONS

Senator WARNER. Well, all this comes to the issue of verification of which the public has an increasing understanding. Do you still have hopes that in the realm of arms control that that issue of verification can be resolved with this particular weapon system which lends itself to concealment and mobility?

General ROGERS. It will be the toughest issue, in my opinion, that those negotiating arms control measures will have to face. With SALT II when I was a member of the Joint Chiefs of Staff I believed that national technical means were adequate for verification; but when one looks at ground-launched cruise missiles and tries to determine if they have a nuclear warhead or conventional warhead, I think onsite inspection would be necessary. Onsite inspection on Soviet soil is something which she has been loath to permit in the past.

Senator WARNER. Have you seen any indication of perhaps a reversal of that hard line against onsite inspection, anything to raise your hopes?

General ROGERS. No, sir; I have not, but I must put a caveat on that, Mr. Chairman, by pointing out that I am not privy to all of the discussions that go on in the margins in Geneva. So there might be something there that I am unaware of.

Senator WARNER. Well, I can appreciate that. I certainly want the public to understand the difficulty of that aspect of the arms control negotiations as it relates to this theater system.

TNF DEPLOYMENT

Would you care to comment on the current status of, should we say, the peace movement in Europe now and what you project for the coming year because that bears on the issues of the TNF deployment?

General Rogers. Well, as one looks at the movements that we have witnessed in Western Europe I think, at least in my mind, there are three segments included in those movements.

The first segment consists of persons who are the dupes of the Soviet Union, those who are representing front organizations who assist in organizing these demonstrations and seeing that the results of them are what the Soviet Union wishes. We know that for a fact, exists. How large a group that segment is, I don't know.

There is a second segment I believe and we have them on both sides of the Atlantic. They are activists who are waiting for a cause to come along that they can join. They get exhilarated and excited by demonstrating. How big that group is I don't know but it is there.

The third segment is the one about which I think all of us should be concerned. It includes not only the young people who have never known war, and if they knew tend to forget that it was appeasement and weakness at the end of the 1930's that made it inevitable that we were going to go to war; they are joined by a fairly sizable group of thinking adults who are worried and concerned about a war as are all of us.

That third segment sort of lashes about trying to find some means to prevent war and they think that pacificism or neutralism or unilateralism may be the answer. They fail to understand that the ultimate fate of a pacifist is peace at any price and they lose their freedom.

They tend to ignore the fact that if you are going to be neutral you have to be prepared to defend your neutrality and requires the allocation of major resources for the defense of your neutrality. Look at Sweden and look at Switzerland.

UNILATERALISM

And unilateralism: history is on the side of those who would point out that to make yourself naked alongside a mighty power does not lead to its disarming, and you then put yourself under the control and good will of the other side and you end up being dominated.

If I may just continue for a moment on this subject, because to me it is very important. The answer which all of us are seeking, assuming that our objective is peace with our freedom intact, lies in the successful negotiation of arms control measures that are balanced and verifiable for all force categories, not just long-range theater nuclear forces, but the strategic and the conventional as well. Only they put predictability into the military situation and only they can reduce and balance forces and the Soviet Union surely must be interested in putting a cap on this spiraling growth so that they can have additional funding for the solution of internal problems.

The message that we need to get across to that third segment is that to be successful at the negotiating table you must negotiate from a position of strength and resolve which is the only thing the Soviet Union respects. Their movements toward pacifism and neutralism and unilateralism tend to weaken the solidarity and unity which we must have behind our negotiator. It is not easy to get that message across, Mr. Chairman.

Senator **Warner**. Well, there is another interesting statistic. I have heard it said that 70 percent of the people alive in Germany today and, indeed, that must be applicable throughout NATO have no clear recollection of World War II. Is that about right? I mean, it is easy to forget and that bears on your point.

General **Rogers**. I don't know what the percentage is, but it is sizable and it does impact upon the positions taken by members of parliament in coalition and minority governments where it is very difficult for political leaders to lead their people. As a consequence, it is not until the people's voice is heard will the Parliament act and it is whatever that voice is saying to which they do react.

But once again we must understand that cognizance must be taken and consideration must be made of these movements. We should not, for example, view what we see on the television as anti-Americanism as being more than just a minority of those in Western Europe. The fact is that what the Kansas farmer or the truck farmer in Florida sees is anti-Americanism signs, Yankees go home, we don't need you over here any more; but that is only about 5 percent of all Western Europeans who feel that way.

That is of great concern to me because I find on the east coast and in the center of this country a feeling that if we are not wanted in Europe, coupled with a perception that our allies are not carrying their share of the burden of the defense arrangements, then we should bring our forces home.

When everything else has been sifted out that is the major concern I have, Mr. Chairman, that in a fit of pique or anger this country might decide to withdraw its forces from Western Europe. This would be disastrous; it would be counter to the vital interests of our own country which extend, at least as far as Western Europe is concerned, to the Elbe and to the Czechoslovakian border. It would lead to the unraveling of the Alliance and I think it would play right into the hands of the Soviet Union in trying to achieve the goal she has set for herself which is domination of Western Europe without ever having to fire a shot.

So I raise all that, Mr. Chairman, because that is of great concern to me. Much of what I sense here in this country is based upon perception which may not be accurate.

Senator **Warner**. I want to turn to my colleague, Senator Goldwater.

Let me just press one last aspect of that question and then I will return to some questions on chemical warfare after Senator Goldwater.

URGE TO WITHDRAW FROM NATO

This the third time that you and I have had this opportunity to discuss this problem of support for defense spending within the Alliance and contingent to U.S. involvement in NATO. The important thing is to determine the intensity of that feeling. Is the feeling to withdraw from NATO greater today than it was a year ago when you were here? In other words, we are dealing with a long-term situation where I, and I think others in the Senate, feel as you do that it is imperative we maintain our positions in Europe and with NATO. But what is the intensity of this feeling both abroad and here as you visit the United States as compared to a year ago?

General ROGERS. I think it is greater and I think it was put in perspective quite well by one of your distinguished colleagues in the Senate very recently who said that, whereas at the beginning of the 1970's when there was this move to withdraw forces, it was pretty much at the initiative of the individual Senator working with others within the Senate trying to convince them that this was the way to go; today it comes from the constituents, at least certainly in his State, and I find that this appears true in others.

It comes from the constituents who are saying well, if this is what they want and if they are not going to carry their load, then bring our troops home. So, yes, it is more intense today I believe than a year ago.

Senator WARNER. Senator Goldwater?

Senator GOLDWATER. General, you said that there had been 70 launchings of the SS-20 this past year?

General ROGERS. No, sir. There had been 70 launchers deployed this past year. In fact, we had estimated at one time that the deployment was at about five a month and in fact if increased to about six a month. So there were about 70 launchers that were deployed into operational sites, sir.

AUTHORITY TO RETALIATE ATTACK

Senator GOLDWATER. We know that you have very severe constraints put upon the operational flexibility of your theater nukes. Do you have the authority from NATO to retaliate if you are attacked with nukes? Do you have to go through the redtape to get permission?

General ROGERS. The ultimate authority, Senator, is the President or the Prime Minister for their own weapons. Yes, at any time that we would resort to the use of theater nuclear weapons, I must seek the release of those weapons from the political authorities, and I think that is the way it should be.

In the first place, on initial use it is such a major decision for the future of the world that I think that must be a decision taken by the civilian authorities of our nations who in fact in peace and war command NATO. I do not object to the fact that in every instance I must seek this release authority from the political authorities.

Now the system that is used, Senator, just very quickly, is that I go to the political authorities at NATO headquarters with the request. I go also to the Ministers of Defense of all the nations and I go also to the two nuclear powers simultaneously with my request for release. But prior to that time there would have been a warning message that I was probably coming to ask for release. And even prior to that, in order to get the political authorities thinking in terms of giving this permission, I would have sent what I would call an "early notification" message to them. So there is a series of steps taken.

THEATER NUCLEAR ATTACK

Senator **Goldwater**. No war comes without warning and your intelligence would tell you an approximate time to expect attack. Now let's say that the first air attacks on our airbases, air or ground attacks on our airbases, were tactical nuke. Unless we responded in kind on their airbases, in my opinion, you couldn't last very long.

Would you have the authority, say that the enemy attacked us in the morning destroying our runways, you would have to go through the political channels to retaliate in kind?

General **Rogers**. I would expect to get authority quite quickly under those conditions, Senator, but I would need to request release.

Senator **Goldwater**. I hope you can get it.

General **Rogers**. But your scenario is different from mine, Senator, because in the first place I don't know why the Soviets would wish to attack with nuclear weapons and wreak that destruction upon the other side and run the risk of escalating to the strategic nuclear exchange because they are just as uncertain as we are whether or not the initial use of theater nuclear weapons by either side will escalate very quickly to the strategic levels.

Another reason why I would suggest that there is no consideration of their attacking today is why should they; if they are patient, and if current trends continue, the Soviets can be successful and accomplish that objective I mentioned earlier of dominating Western Europe without ever having fired a shot. So that is why your scenario and mine are just a little different.

Senator **Goldwater**. Well, I am not talking about strategic weapons. I am talking about small nukes launched from an aircraft for the destruction of runways.

General **Rogers**. I understand that, Senator, but I still go back to the point that with no empirical data upon which to make a projection about whether or not first use of small nukes will escalate to the strategic level, great care must be taken in deciding whether or not to use that first nuclear weapon irrespective of size or where it is placed.

I happen to be one of those who believes that certainly under current conditions there would be a very quick escalation to the strategic level. I just can't believe that there is any Soviet leader current or future who wishes to expose his country to that kind of destruction.

Senator **Goldwater**. Do you honestly believe that the deployment of small tactical nuclear weapons could immediately escalate into strategic weapons?

General **Rogers**. Yes, sir, I do if those small weapons are employed. And may I put that into perspective. I know I am not the only witness this morning, but very quickly, should there be an attack against NATO by the Warsaw Pact, I think it would be conventional and I think it would probably come as a spillover from somewhere else.

Under current conditions with the status of our conventional forces, and particularly our lack of sustainability, we have built ourselves a short war. That is why the strategy which I can implement today, Senator, is the strategy of "delayed trip" wire, delayed by a certain number of days, depending upon warning time, timely decisions by political authorities and appropriate decisions by the political authorities and so on.

When D plus X Day comes, we face two options in NATO under current conditions. We either have to escalate to theater nuclear weapons, which is one of the responses built into our strategy of flexible response, or we have to capitulate. Neither one of those is viable in my view and that is why our objective in Allied Command Europe is to get sufficient conventional forces to hold the initial thrust of the lead divisions of the lead armies until we can take under conventional attack the follow-on divisions of those lead armies that follow at about 70 to 200 kilometers behind.

The technology exists to acquire those targets and the technology exists to destroy those targets if we are prepared to develop it. I say to you now that I am very encouraged by the position that is taken by the United States. It has to take the lead in developing both the targeting, analysis, and the destruction capabilities and it is taking the lead in doing this.

If nations will meet their commitments that they will agree to next May for the 1983 to 1988 force proposals and meet them on the milestone schedule we postulate, then by the end of this decade we will have the kind of a conventional force I have described. Then, if attacked conventionally, we can force the decision to the other side to escalate or withdraw.

As I say, they don't want to escalate to the first use of theater nuclear weapons any more than we do because of their uncertainty as to its further escalation to the strategic level.

I might say that their option, their alternative to escalation, which is withdrawal, I would think would be much more palatable to them than the alternative to our option of escalating, which is capitulation.

That is why it is important that the citizens of the nations of our Alliance understand the threat, what is necessary to meet it, and to make some sacrifices today as is occurring in the United States so that we can reach a solution at the negotiating table to resolve all these problems and put on a ceiling and balance all categories of forces and arms.

Senator GOLDWATER. Do you think the citizens are aware of this, or are they generally tending to want to do away with all the nuclear structure?

DETERRING USE OF NUCLEAR WEAPONS

General ROGERS. All of us want to do that. All of us want to do away with nuclear weapons, but we have to face the world as it is and under current conditions we need to deter their use, as you know, and that is the purpose of our having them.

I believe that the citizens of this country got the message that there was a menace to future freedom and therefore added steps needed to be taken to enhance our security arrangements even at the expense of other programs.

I might just add that those of us who have the opportunity to live in Western Europe are watching very carefully this fiscal year to determine if in fact the citizens of this country understood that in the mandate of November 1980 to enhance security arrangements it was also implicit that they were prepared to make sacrifices in other areas.

If that message continues to come through from the leader of the Alliance, then we have an opportunity to have the citizens of Western Europe understand the threat and be prepared to follow our example to make sacrifices and send that message to their elected representatives.

If they don't send that message, there is no way, in my opinion, that security arrangments will get the No. 1 priority which I believe it should have today.

Senator **Goldwater**. Thank you.

That is all I have.

CHEMICAL WARFARE ATTACK

Senator **Warner**. Let's take Senator Goldwater's exchange, which was a very good one, and substitute chemical attack instead of theater nuclear attack. It is very important that we get into the record in both open and closed some strong testimony on that issue because it is the intention of the President, as you know, in this fiscal year to request of Congress added funds to prepare ourselves as a deterrent measure against the use of those types of weapons.

Could you then give us your comments on the present status of the Soviet capabilities of chemical and biological warfare and what steps the United States should take.

General **Rogers**. We are aware of the doctrine of the Soviet Union which is to use chemical weapons offensively to assist in accomplishing whatever the mission may be.

We are aware that in exercises their forces exercise the offensive capability of chemical weapons, and I have to restrict myself, Mr. Chairman, to the chemical side because my information on the biological side is rather limited and what I have I wouldn't want to give in open session.

As for chemicals, they have not only what we perceive as being the greatest offensive capability but they also have the greatest defensive. They allocate thousands of forces, we estimate somewhere between 70,000 and 100,000 troops, solely to the use of and defense against chemical weapons.

They train in their exercises sometimes with live agents so that they can assure themselves that the individual is taking seriously the requirement to put on the overgarment, the boots and the mask and to undergo the enervating experience of trying to operate under those conditions.

I have been on record, Mr. Chairman, for a number of years advocating the development of a modern adequate retaliatory capability to deter the use of chemicals by the Soviets. We have been singularly unsuccessful in reaching agreement at the conference table with the Soviet Union, I think from about 1977 to 1980, to ban all chemical weapons, which is our long-term goal. And why should they negotiate seriously when once again they have the blue chips and we don't.

Mr. Chairman, there is a lot of misinformation that one finds in the media today about how great our stock is of chemical weapons and types of weapons that we have. You read such things as we have got enough to kill every man, woman, and child 50 times over.

I am just saying to you, Mr. Chairman, when one looks at the capability to use what we have on the battlefield, and I know what it is, it is inadequate and it is running into a wall of obsolescence, obsolescence that is created both by the deterioration of the chemical warhead and the deterioration of the projectile on which that warhead is placed.

We do not have the proper types of chemical weapons that are necessary to deter their use by the Soviets.

I have another overriding requirement as SACEUR. The political guidelines under which I function say that I will be prepared to use chemical weapons in retaliation for the use against us by any aggressor. Under current conditions I cannot fulfill that directive to me in the manner in which I think it should be fulfilled.

Therefore, I was very pleased to see the United States make the decision to start producing the modern binary round and to consider producing more than one type of warhead for that round.

PRODUCING BINARY WEAPONS

I personally am convinced that the signal we send when we start producing the binary round is sufficient, and that signal is, you use them against us and we will retaliate. Then we will have a situation similar to what existed in World War II where both sides had chemical weapons and neither side used them for fear that the other would retaliate.

So I am very pleased that the United States has made the decision to produce the binary round. We do not need to get into a discussion as to whether or not those rounds ought to be stored in Europe or kept here in the United States centrally located. To me that is not material.

The important thing is we are sending the signal that we are prepared to retaliate and therefore we might be able to deter their use by the other side, and I think we will. Second, it gives us another blue chip at the negotiating table to accomplish the major goal we have which is to ban all chemical weapons from the face of the Earth, and I am one who wants that just as much as anybody else.

Senator **Warner**. General, let's see if we can't stress one other very important fact on this issue. During the recent recess I went out and actually inspected these weapons to verify for my own knowledge exactly what you said, and indeed it is true.

STATUS OF CHEMICAL WEAPONS INVENTORY

The most startling impression that I gained, one of the most startling, was that while we do have a substantial inventory, for example, and I think we can put this in the clear, a very substantial inventory of it is in 105 rounds, and there is a question as to their individual condition, some lots are deteriorating and it is questionable whether they could even be handled safely by American service personnel or any other personnel for that matter, I was astonished to find that even if we are able to handle it and move it from storage sites in the United States or other storage sites in Europe to a battlefield situation, the actual tubes themselves with which to fire those rounds are no longer part of the Table of Organization of the fighting units.

So there is an enormous mismatch between the major part of our supply, which is frequently referred to by colleagues and others who are opposed to the binary advancement, and the tubes with which to utilize them. Am I correct in that?

General ROGERS. That is correct. When one looks at Western Europe, almost all of the artillery that we have, and I am talking not just about the U.S. forces but also other forces, is comprised of 8-inch and 155-mm. Sixty-five percent of the artillery tubes in Western Europe that belong to Allied Command Europe are 155 mm. We did away with the 105 some time ago, except for certain special cases. Some 105 artillery is still found among our allies.

Senator WARNER. Yet it is that 105 which comprises the biggest inventory of chemical weapons. Am I not correct in that?

General ROGERS. Senator, I would not wish to put it as comprising the largest amount, because we have got a lot of bulk chemical material, as you know, which isn't in bombs and it isn't in artillery warheads or anything else.

Senator WARNER. I am familiar with that, but this situation could come on you so quickly that we can't begin to rely on moving that bulk into warheads.

General ROGERS. We cannot use what we have unless it is a round that can be fired from the artillery we have. That is why it is very appropriate, I think, that the kinds of warheads the United States intends to develop are the ones which we can use in fact should we have to, to retaliate.

SOVIET SCHOOLS ON CHEMICAL AND BIOLOGICAL WARFARE

Senator WARNER. One last point to try and explain to the American public what we are up against. In my own research, and I haven't fully completed it on this subject, but I am pursuing it as fast as I can, but my own research indicates that within the Soviet Union they have 4-year schools comparable to Annapolis and West Point to which certain designated officers go and spend 4 years solely or primarily on the subject of the use of chemical and biological warfare. Are you aware of that?

General ROGERS. I am not aware of that, Senator, no.

Senator WARNER. Well, I am going to get that very clearly put into the record at some point.

General ROGERS. But I will soon become aware of it.

Senator WARNER. General, we thank you. I hope that you and I and Senator Goldwater and others have achieved some record for public consideration today on these vital issues that face us in your command.

General, I thank you, and we will now go into executive session. The clerk will inform the Chair as soon as the room is available for executive use.

[Whereupon, at 10:25 a.m., the subcommittee recessed in open session and proceeded in executive session.]

EXECUTIVE SESSION

The subcommittee convened in executive session at 10:28 a.m., in room 224, Russell Senate Office Building, Senator John W. Warner, chairman, presiding.

Present: Senators Warner, Nunn, and Levin.

Senator **Warner**. General Rogers, I thank you for your candor during the open session, difficult as it was, but we just have an obligation to share as much information as possible with the public.

As you dramatically said, it is 5 percent of the people in Europe that is getting all the attention.

General **Rogers**. I appreciate that, Mr. Chairman.

If I might just pick up some of the things——

Senator **Warner**. Yes; let's go ahead now and tighten this record up.

General **Rogers**. With respect to the United Kingdom and the implementation of the decision, we do not anticipate any difficulty as of now. We see no slippage in her making the IOC of December 1983 to have the GLCM's on site.

Now that is a very important date [deleted].

[Deleted.] So all the indicators are in the green at the present time.

But I did want you to know that we have that problem [deleted].

I wanted to mention that I still have some optimism that Belgium may make the decision to deploy the GLCM's on her soil [deleted.] I would say that I hope that the Dutch might make an affirmative decision [deleted].

So we have this overlapping of decisions by a nation which contributes to the political fragility of the implementation of the decision.

There is no need that I give you the initial operating capability.

CHEMICAL WARFARE

Senator **Warner**. Is there anything that you want to add on chemical warfare? I heard the following scenario discussed that if the Soviets took a sector, perhaps a sector that was partially in one NATO country and partially in the United States, they have a 50-mile sector and suddenly launch a preemptive chemical attack from the very front lines right on back, say 30 or 40 miles, and that it would spread such havoc that the allies would practically collapse and sue for peace within 72 hours. Now I know that sounds a little extreme, but some of that discussion and type of deliberation is going around. We simply wouldn't know what to do. Both of the civilian populations would go into a total state of panic. Perhaps the ally that shares this sector with the United States wouldn't even have any chemical capability, not only weapons but protective capability.

Could you comment on this?

General **Rogers**. Well, the civilian populace does not have the protective capability.

Senator **Warner**. Of course we know that, yes.

General ROGERS. The status of defending against that kind of an attack varies by nation insofar as fulfilling the commitment that she has made to give sufficient protective equipment to the troops. [Deleted.]

[Deleted.]

Senator WARNER. They have nothing. I mean you used the words "good shape," but it is almost nothing, isn't it?

General ROGERS. In some instances it is negligible. That is correct.

Senator WARNER. They may have some masks but they don't have any suits.

General ROGERS. That is correct.

Senator WARNER. Is that open or in the clear, that response?

General ROGERS. About what they have?

Senator WARNER. Yes.

General ROGERS. I would prefer not in open session [deleted].

Senator WARNER. Could your staff at some point in time give this subcommittee the maximum to which we may go in trying to dramatize the vulnerability of the allied forces, the NATO forces in this area?

General ROGERS. My scenario would be a little different from yours. My scenario would be that they would use their FROGS or their SCUDS or their SCALEBOARDS or their replacement therefore with chemical warheads on them to lay down persistent attacks against airfields. You don't have to lay a whole belt, but lay persistent attack against airfields, against logistics facilities, against our nuclear capabilities and a whole series of targets in the rear area which would make it very difficult to support ourselves to fight the war.

Senator WARNER. You are talking about nuclear capabilities now and not chemical.

General ROGERS. I am talking about chemical. I am talking about persistent chemical weapons or persistent gas.

Now we need that kind of a capability as well, and that is why I mentioned that I was pleased to see we are looking toward making bombs with persistent gas. [Deleted] and I mentioned the obsolescence problem that we have.

So we would like to be able to retaliate in kind if necessary against varied attacks with persistent gas. But the Congress in its wisdom has failed to provide the construction money that we need for our airfields [deleted].

We fight almost on an annual basis to get that kind of funding from the Congress but it has a tendency to fall out. We need that, you see, if we are really serious about this business of being able to defend the forces we have or at least permit them to survive in a toxic environment.

My scenario is a little different from yours but it ends up the same way though, of making those kinds of installations unusable unless we have provided the kinds of either environment or protective garments for the people that have to exist and function in those areas.

Senator WARNER. Well, the scenario I was discussing even went further, that the Soviets would launch of course a military attack, but at the same time threaten to drop some of these in both

London and Paris and the other major capitals of the world if we didn't sue for peace within 72 hours.

You know, you and I tend to still go back, although you are a few years my senior, and fight the war under the Marquis of Queensbury rules, but these fellows are not going to do that. What chivalry there may have been in warfare at one time has long since gone. If they want Europe intact and feel that they don't want to grind down their conventional forces in a war or stalemate or otherwise or avoid nuclear attack, it seems to me that the chemical thing might be the very means by which they could shock Europe into submission after a brief period of time, showing on the battlefield in some small areas of the civilain population the devastation of this capability and then just threaten to drop several of these rounds into the capitals of Europe.

ABILITY TO RETALIATE

General **Rogers**. That is why we have to be able to retaliate. That is why I am so grateful for the efforts that you and Senator Stennis have expended in trying to get this through the Senate. We talked about this last year and your frustration of the preceding year is not being able to get it through. Now we have. We have got the facility, we have got the facilitization of it and we are going to produce it, and that to me is the only message that we need to send.

Give us two kinds, one that we can fire from artillery and a kind that we can load onto aircraft, give us that flexibility, give us the kind of persistent gas, modern, that we can handle and store with great ease. This is the signal we need to send. [Deleted.]

Senator **Warner**. But the assumption there is that we have time within which to do it, and that is my problem. Frankly, I am personally less concerned at this point in trying to get all the logistical backup that is needed for enabling that pilot to begin to operate because I have misgivings as to whether he can do it. Then all the ground support personnel would have to have comparable protective devices.

It seems to me that we ought to have a strong retaliatory punch poised and that that would be less costly and more effective as a deterrent than just warehouses full of suits and other things to stand there and take it in the teeth for a period of time. I don't know. That is my view.

PREPARED TO FIGHT IN CHEMICAL ENVIRONMENT

General **Rogers**. Well, you put yourself in a position then, Senator, of the Soviet Union and Warsaw Pact forces being fully prepared to fight in the chemical environment and we not. So they dump their load on us and we can't defend ourselves and can't fight in that environment and we dump our load on them and they can. That is why I think it is a double-edged sword, one, to be prepared to exist and survive in the toxic environment, but equally important, to be prepared to retaliate so maybe they will never be used.

I just believe that we are sending the proper message right now and now we ought to push. The United States ought to take the initiative to get back to the negotiating table with the Soviet Union now that we have shown this blue chip and see if we can't ban chemical weapons worldwide, providing we can make such an agreement verifiable.

Senator **Warner**. There is your point, verifiable. But how, General, do you make it verifiable?

General **Rogers**. There has to be on-site inspection, and even then it is very difficult. I understand that.

Senator **Warner**. Well, we are working on it.

Some have argued that the Europeans with their 105's could fire the chemical rounds that we now have. What are the attitudes of those policies with regard to the retaliatory use of chemical weapons? I think maybe you have touched on that just now, that if the first round is fired they in turn do anything possible to retaliate providing there is time to get our 105's rounds to wherever their tubes are, and match them up.

General **Rogers**. Well, you are talking about [deleted].

Senator **Warner**. That is about where the 105's are?

General **Rogers**. This country has an obligation to 325,000 forward deployed U.S. forces in Western Europe not to forget them and to give them the support that they need in order to be successful on the field of battle. [Deleted.]

Senator **Warner**. General, that is the bottom line. Our first obligation is to 325,000 Americans that we have sent from the shores of this country and placed them in those forward positions.

General **Rogers**. Yes, sir.

Senator **Warner**. I couldn't agree with you more.

Turn to the zero option. What is your personal opinion of the prospects for President Reagan's zero option currently underway in Geneva?

General **Rogers**. If I were the Soviet Union I would accept it. Militarily it causes me some problems for the following reason. [Deleted.]

It is all the more important even in the future if we are successful with that zero-level outcome to insure we have a high sense of confidence in our conventional forces which we do not have at the present time. As I have mentioned, we have built in that short war.

So I am surprised that the Soviet Union has not accepted the zero-level outcome. Now I don't want you to misunderstand me, Mr. Chairman. It was right for us to take the initiative with the zero-level outcome. Politically it gave us the initiative and that was very important. Now it is up to the other side, if it is really serious, to accept that solution. It would do away with all the SS-20's and 4's and 5's on a global basis and the Soviet Union won't have to worry any more about our Pershing II's which is their greatest concern.

It also recognized the antipathy of the publics within NATO to nuclear weapons. It was the right thing to do. It gives me a little bit of gas pain on the military side but I can live with that if we enhance our conventional forces and keep the nuclear threshold high so we don't have to resort to the short-range weapon.

Mr. Chairman, I need to put that in perspective very quickly.

LABS AT LOS ALAMOS AND SANDIA

Senator **Warner**. Let me just point out in the record that I mentioned earlier my visit to the laboratories at Los Alamos, Sandia and so forth during the Senate recess, and while they are primarily concerned with the technical aspects, as you may know they have a wealth of individuals who are studying all aspects of this and they share your view. Yes, indeed, they share your view. You are not alone on this point. This is going to break out in the open soon, and maybe it is somewhat around the fringes now, but we have got to be prepared to counter these arguments.

General **Rogers**. You see, in the current guidance under which I function as SACEUR [deleted].

That is why I mentioned in open session that I would have already sent very early in a confrontation a message to the political authorities giving them early notification that they should start thinking about having to consider the release of theater nuclear weapons. [Deleted.]

Senator **Warner**. As you know, under the President's strategic force modernization program substantial numbers of sea-launched nuclear tipped cruise missiles are to be developed. Do you expect to have these weapons available to you as the Theater Commander in the near future?

General **Rogers**. Well, if I understand the plan of the United States, these nuclear tipped sea-launched cruise missiles are [deleted]. As a consequence they would not be assigned to me as are some of the submarine-launched ballistic missiles. So I would not anticipate having them come under me at all.

Senator **Warner**. That is precisely it. Do you think we ought to then instigate a program where they would be integral to the NATO structure?

General **Rogers**. [Deleted.]

Senator **Warner**. Does this undo whatever achievements we may make in the TNF negotiations, this contingency?

General **Rogers**. [Deleted.] Where we would lose would be, in my opinion, that it would show the Soviet Union it had been successful with its propaganda and misinformation campaign once again in keeping the Alliance from implementing a vital decision.

Therefore, I think she would treat us with certainly less respect at the negotiating table as a consequence.

SIGNIFICANCE OF GASLINE SITUATION

Senator **Warner**. General, one last comment. It would be helpful if you would comment on the significance of the gas pipeline situation. Frankly, I view that as a more serious signal than the peace movements.

General **Rogers**. Senator, I am getting into an area in which I don't belong.

Senator **Warner**. This subcommittee has the jurisdiction over large sums of money to substantiate indirectly your mission. I am continually asked in my role of advocating this strategic program, well, what about the gas pipeline? Therefore, I would like to have some of your views in the record on this issue.

General **Rogers**. I will give them to you very quickly. One of the major objectives in obtaining the goal of world domination which the Soviet Union has had since 1917 is the domination of Western Europe, as I said, without firing a shot. If the Soviets provide a source of energy and has its hand on the wheel that can close the valve sometime in the future the Soviets can use the provision of gas as a club to dominate.

But, Senator, let me just tell you what it looks like in the Western European perspective where I sit. They say don't talk to us about not building the gasline until you are serious about not selling wheat to the Soviet Union. If you quit selling wheat, we will think about not going through with the gasline deal.

On the other hand, we say to them you continue the gasline and we are going to continue to sell wheat, and we go through that revolving door chasing each other and the end result is we do both, we sell the wheat and we get the gasline. [Deleted.]

But I couldn't agree with you more. Even though the point is made by West Europeans that it is a relatively small amount of energy, still it is a sizable amount of natural gas that is being provided to them. A hand on that tap, in my opinion, is unfortunate.

Senator **Warner**. General, thank you.

We are joined now by our colleague, Mr. Levin. We have just concluded the questions of the General but subject to any comments you might wish to make by way of an opening statement and questions, Senator Levin.

Senator **Levin**. Thank you.

I don't have an opening statement. I came in just in time to hear you say something about wheat and gas that I couldn't agree with more. I think it is absurd for us to think that we are going to persuade them not to build that pipeline while we are shipping wheat and we shouldn't do that either. I happen to agree with you.

MARITIME SUPREMACY

I want to just ask you a couple of questions. First about the maritime, our new maritime supremacy document, whether or not that raises any concerns in terms of the defense of Europe and how much of the resources we will commit to that defense in light of the proposed fairly dramatic increase in terms of the maritime commitment, the implications for naval defense and whether or not any of your colleagues in NATO have raised some concerns, any of our allies, about this new strategy. Have such concerns been raised?

General **Rogers**. The concern comes not so much that the United States doesn't need to improve its maritime strength, but for the very reason you alluded to that the impact will come in the conventional area and result in a lesser amount of resources being provided to conventional forces.

It is the same, Senator, as we watched the United Kingdom make the decision on modernizing their strategic force. I was told at the time they made that decision that it would not impact in any way on the conventional strength and we now see what is happening. It is impacting on the conventional strength.

Senator **Levin**. So those specific concerns have been raised with you?

General **Rogers**. They have been raised.

LEVEL OF CONTRIBUTION BY OUR ALLIES

Senator **Levin**. What about the level of contributions of our allies? I gather you are not satisfied with them. We are not. We know where there has been some real falling down beneath the 3 percent goal which had been accepted by the heads of nations a few years ago. I think we have had limited success essentially, let me put it this way in terms of my own feelings, in achieving that growth. I am wondering whether or not we should be doing more to try to pressure our allies since the diplomatic approach, the quiet one which the Secretary frequently urges us to pursue hasn't worked all that well. Why shouldn't we put some additional public pressure on our allies to meet those 3 percent goals?

General **Rogers**. Senator, I believe that what we need to do is to make a greater effort to educate the citizens of the nations. Let me be more specific.

I had said earlier in the hearing that until the message is sent from the peoples of our allies to their elected representatives in their parliaments, the parliaments and the government will not lead and give the priority to defense.

EDUCATING OUR ALLIES

We have to educate those people some way. [Deleted.] So opinion-makers have to lead and inform them. This is where I think, rather than ICA doing this informing as a U.S. effort, which is viewed as propaganda by a U.S. Government agency and therefore has little credibility in Western Europe, that USICA should provide the proper kinds of information in collusion with public opinion-makers in these countries—to include NATO—and let them put the NATO stamp on it and the nation's stamp and publish it themselves.

I have, just to keep myself honest, spoken to Mr. Wick along these lines. That is where I think our effort needs to go, because until our allies' people are convinced that there is a threat to their freedom, they are not going to forgo what I consider the syndrome of risen expectations where they are comfortable with the social gains they have made and with their prosperity and will not sacrifice as our people are prepared to do.

Senator **Levin**. Let me give you a Hobson's choice. I hope it is not the first one this morning but it may be.

Let's assume that the pressure for chemical weapons and neutron bombs is counterproductive in terms of getting our allies to spend more, and that we can not succeed in achieving both those goals, that they turn out to be politically inconsistent and the more we push the chemical weapons and the neutron bombs the tougher sleding we are going to have in terms of obtaining the 3 percent real growth. Whether it should be that way or not in my hypothetical isn't the issue. My hypothetical is that it is that way. Which one is more important?

CHEMICAL RETALIATION CAPABILITY MORE IMPORTANT

General **Rogers**. It is more important to me to have the modern adequate chemical capability to retaliate than the neutron weapon.

Senator **Levin**. No; I meant between the chemical one and the neutron, on the one hand, and the 3 percent real growth on the other hand.

General **Rogers**. Let the neutron go. The 3 percent isn't enough but it is moving in the right direction.

Senator **Levin**. I understand, but just to achieve even that, if we were impeded in achieving that by pushing for the chemicals and the neutron bomb which would you give up on, the 3 percent goal or would you give up on the chemicals and the neutron?

General **Rogers**. I would give up on the neutron but I wouldn't give up on the chemicals. We must have that retaliatory capability to deter their use. I can get the same effects from the weapons we have now as I can get with the neutron weapon warhead. The only trouble is that it can't be used in as close proximity to our own troops because of the blast and thermal damage of those that we have.

M-1 TANK

Senator **Levin**. The last question that I have is on the M-1 tank. You read a lot that the M-1 is a lemon and that we ought to delay production of it. We have had some experience now with it in the fields, and I am wondering whether or not you can give us your own opinion of it. Is this thing the best tank in the world, or is it the biggest lemon in the world?

General **Rogers**. You and I ought to ask the man who owns one, Senator. I am talking about the tank commander of one of those tanks in Europe. I give you that answer because that is what I get from my Component Commander, General Kroesen, who deals with the battalion that has them. They are very happy with the M-1. The maintenance is much less than with the M-60A3. It performs exceedingly well. Everything is green as far as talking to the customer, the man who uses it and his crew. As I think General Kroesen would point out to you if he were here, he is encouraged to see the number of individuals who are intending to stay in Europe so they can remain a member of that organization with the M-1 tank.

Now having said that to you, I am just not sure, Senator what the facts are about the performance of the tank [deleted]. That has yet to be disproved to me, but it may be just because of where I sit these days I haven't been involved in it.

Senator **Levin**. Thank you.

Mr. Chairman, I wonder if we will have an opportunity to ask the General some questions for the record.

Senator **Warner**. Of course, Senator Levin.

Senator **Levin**. Thank you.

Senator **Warner**. You submit those questions.

We are anxious to let him go, but Senator Nunn has joined us and we have adequate time, Senator Nunn, for your questions.

Senator **Nunn**. Thank you, Mr. Chairman.

Is General Rogers pushing a schedule?

Senator **Warner**. We are on schedule. So you just take your time.

Senator **Nunn**. Glad to have you, General Rogers.

General **Rogers**. Thank you, sir.

Senator **Nunn**. I just want to ask a few questions. I will try to avoid the ground that you have already been over, but I will follow with interest General Rogers' responses in the record and the staff will brief me on them.

CAPABILITY TO SUPPORT CONVENTIONAL CONFLICT

General Rogers, how would you describe the current capability of the United States and our allies to support the type of conventional conflict that your headquarters envisions for NATO center just in general terms?

General **Rogers**. We do not have the sustainability to support a conventional war for any length of time, Senator, without escalating to nuclear weapons.

Senator **Nunn**. What are our objectives now, what are NATO's objectives in terms of ammunition and war reserves against what we currently have available? I will just ask you to generally describe that and perhaps you could give me a rather detailed answer for the record, if you would.

AMMUNITION AND WAR RESERVES

General **Rogers**. I will do that. We set at NATO [deleted] days, supply of petroleum products. We set [deleted] days of supply for ammunition and we would like [deleted] days on pre-positioned war materiel.

The only nation that comes close to meeting all of them is the United States. Yet, it has some shortfalls in [deleted]. The United States cannot sustain a conventional war for any length of time because it lacks the manpower base in the U.S. Army at the present time with which to sustain it.

Senator **Nunn**. Is that the primary and fundamental reason [deleted].

General **Rogers**. No, sir, it is not the only reason. Our pre-positioned war reserve materiel stocks are [deleted]. Now that is not unique with the United States.

The question is will we run out of equipment first or will we run out of manpower first. I would say we probably under current conditions would run out of equipment to replace losses, but that doesn't make me any more comfortable about not having the infantry men, the artillery men, the tankers, and the medics available to replace combat casualities before the draft can take over and give me a steady stream even with registration in effect.

NATO OBJECTIVES ON AMMUNITION AND WAR RESERVES

Senator **Nunn**. Let me ask a question for the record just so we will have that. I would like to know the NATO objectives in terms of ammunition and war reserves versus what we currently have. Then I would like for you, if you could, to submit the 5 year plan and what we will have at the end of 5 years if we all do what we theoretically should and how that would compare with the requirements as officially adopted by NATO.

General ROGERS. Let me give that to you for the timeframe 1983 to 1988.

Senator NUNN. Whatever you already have. I don't want you to prepare something new.

General ROGERS. I will give that to you for the record.

[The information follows:]

The NATO objectives for ammunition and POL are [deleted] days and [deleted] days respectively. Current levels of ammunition and POL for NATO Europe average [deleted]. The fiscal year 1983-88 force proposals, it agreed to and if the goals are met, will provide an adequate conventional deterrent for NATO by [deleted].

U.S. MANPOWER PROCUREMENT

Senator NUNN. I guess the other question would be if someone told you that the manpower procurement policies of the United States will stay the same and the results will generally be in the next 2, 3, 4 or 5 years what they are now, and I say now because it has improved I understand in the last year or two; in other words, as given as far as not making a radical or a fundamental change in manpower policies as they exist now over the next 5 years, would you believe under those conditions that it will be possible to have a so-called long war capability in Central Europe?

General ROGERS. No, sir, I do not. I say that primarily for two reasons.

One, the missions assigned to the services require additional force structure. To have additional force structure you have to be able to man them, and I have always believed that the maximum that you could get for the U.S. Army from the volunteer environment with the type of soldier that we need is somewhere between [deleted] thousand. I have not changed that opinion since 1972.

To get additional force structure to accomplish the rapid deployment force objective and still leave sufficient forces to reinforce Allied Command Europe [deleted].

Second, there is the shortfall of the pool of trained combat arms personnel, the Individual Ready Reserve (IRR) I alluded to earlier.

Senator NUNN. Well, the thing that is puzzling to me, frankly, is that we seem to be going in the posture statement and in other statements to a so-called long-war theory in NATO, and yet there is no inclination at all to change the manpower procurement practices.

My concern is that those two things are fundamentally incompatible. Do you share that concern?

General ROGERS. I think that is pretty much where I came out with my comment earlier, Senator, yes.

Senator NUNN. I suppose there certainly is a strengthening of the ammunition stocks and the war reserve and pre-positioned equipment and all of that that you can do even with the present manpower policies that will help you and assist you, but there must be a point, and I don't know where that point is, I think we have to find it around here in the next couple of years, at which it doesn't make much sense to have more ammunition and more reserves and more pre-positioned equipment if you continue your current manpower policies. I don't know whether you can identify that point precisely, but is seems to me that may be a challenge that we have.

General ROGERS. I would not this morning, be able to identify that point precisely and probably not in the series of next mornings. But certainly if we are talking about a 600-vessel fleet, the thought has to cross the mind of the Navy personnel manpower managers about where they are going to get the men to man them.

When we talk about the U.S. Army increasing a minimum of 100,000 men in order just to flesh out the current structure, overcome the shortfall of combat service support personnel, be able to bring our forces up to wartime authorized strength, [deleted] we are talking about 100,000 for the U.S. Army. Where to you get them? I don't believe you can get them with a volunteer system.

Senator NUNN. Are you talking about Active?

General ROGERS. Yes, sir, Active. I don't believe you can get them, you see, in the volunteer environment, not of the type we wish to have. But none of that, Senator, addresses the major manpower deficiency this Nation has today, which is the Army does not have an adequate manpower base from which to mobilize, and it has not had one since we lost all the combat skills from the IRR. Until we find a bigger compress for that wound than just the band aids we have applied in the past, we are not going to solve that problem.

Senator NUNN. Well, I completely agree with you, General.

LONG WAR VERSUS SHORT WAR

The other question I have when you talk about long war versus short war, I never have been very well informed on exactly what each one denoted. Do you have a definition of long war and short war in NATO as such? Is that a term you could give us a definition for?

General ROGERS. What I want as SACEUR is the capability to fight conventionally long enough to hold the lead divisions of the lead armies until I can destroy the second echelon divisions of those lead armies before they can join the fight at the general defensive position.

Senator NUNN. Is that a given number of days? I mean, if you pegged it down would that be 30 days, 60 days, or where would it fit in the general scheme of things?

General ROGERS. You are asking me to be much wiser than I am and to be able to factor out the kinds of assumptions one would have to make.

Much depends upon decisions by political authorities. I just say to you here that that is one of the concerns that we have.

Let me be more specific. If in a period of tension we can get the political authorities to give us the permission to start bringing our reinforcements over from the United States—those that are left and haven't been already deployed with the Rapid Deployment Force—to start moving toward our general defensive position so that our soldiers can capitalize upon what capability they do have in the time that is available before an attack comes, then we can hold fairly firmly under those conditions [deleted].

So the critical time, Senator, is the [deleted]. Those are critical, because I want to keep those second echelon divisions from joining the battle at the front. I also want to keep those armies that are coming through the choke points in Poland and Czechoslovakia and East Germany from coming through on a free ride; we can do that with the forces that we could get deployed into those areas and that's all I will say on that subject.

What you are really driving at, Senator, is how many days of supply do I think is necessary for every nation to have to support themselves in a conventional war so that we can be successful and force to the other side the decision to escalate or withdraw.

Senator **Nunn**. You have asked the question much better than I ever could, and now if you could give us the answer. [Laughter.]

General **Rogers**. I go back again to my scenario which I have described. If we had a [deleted] capability in theater with the capability to back that amount up from our industrial production base, I think [deleted] would be adequate for me under that scenario.

Senator **Nunn**. Thank you, General Rogers.

What would we have if the 5-year plan were fully and completely implemented by every nation in NATO? Turning the plan into theoretical accomplishment, how would that compare to the [deleted].

General **Rogers**. If we fulfilled the 1983 to 1988 force proposals which are now being scrutinized at the political level, which we, the major NATO commanders have drafted, by the end of this decade, we could come close to the kind of conventional capability that I am describing.

But I want to get specifically into the subject of the [deleted] of ammunition and pre-positioned war reserve stocks which I will provide for the record. A general statement is we will be very close to what I am asking for if the nations will meet their commitments, including the United States, on the milestone schedules we have developed in our force proposals.

Senator **Nunn**. Which NATO countries have signed off on in theory?

General **Rogers**. We are working with the Ministries of Defense and I would anticipate that the Ministers will sign on to those force proposals in May of this year when they will consider them.

Senator **Nunn**. So what has already been signed off on is the 5-year plan adopted in 1980, 1979?

General **Rogers**. Well, that was 2 years ago.

Senator **Nunn**. That plan doesn't go far enough then.

General **Rogers**. They haven't met the commitments so now we are trying again.

Senator **Nunn**. Well, I know they haven't met the commitments, but I mean if that plan itself were fully implemented you are still saying that you have to adopt a supplemental plan to go further than that plan did, and I am getting away from the question of who has done what.

General **Rogers**. Yes. In the previous ones we did not emphasize the necessity to destroy the second echelon as we have emphasized in the 1983–88. I think that is key, and you couple that with the enhancement of our electronic warfare capability, to blind the radars and cut their communication, to jam them, gives us all a capability to be successful in the first several days in conventional attack and force the decision on them whether they wish to withdraw or escalate.

SHORT WAR THEORY

Senator **Nunn**. Well, let me ask you one other question along this line. Secretary Weinberger in his posture statement had a critique of the so-called short war theory, especially for NATO. What I am really trying to do is determine where the budget reflects the view you have just articulated and where it may go further and where it may go shorter.

He states and I quote: "Another fallacy in recent defense policy regarding conventional warfare has been the short war assumption, the notion that in planning our strategy and designing our forces we could rely on the assumption that a conventional war would be of short duration. I have instituted changes in our defense policy to correct this fallacy."

Now my question is based on that statement, is that consistent with what you have just articulated for [deleted] days? In other words, is Secretary Weinberger saying the same thing you are saying, or is there something different? How do you understand his statement?

General **Rogers**. I think we are saying the same thing. He has, I think, set an objective for about [deleted] for the U.S. forces prepositioned in Western Europe, whereas we set [deleted] and frankly we are running about an average [deleted].

Senator **Nunn**. How about the United States now? Where is the United States?

General **Rogers**. The United States is at about [deleted] of ammunition for the ground forces in Europe. We have a deficiency in our [deleted] both in the Navy and in the Air Force. I think they would estimate that the Air Force is at about [deleted] that are required.

The Secretary is right. We have believed in the past that it would be a short war and we have with our allies built ourselves a short war because we can't sustain anything but a short war under the best of conditions, and therefore we will have to escalate to nuclear weapons.

What we are striving for, as you know, is to raise that nuclear threshold, enhance our deterrence and raise the nuclear threshold and force the decision to escalate onto the Soviets.

Senator **Nunn**. Well, I completely agree with that and I think that is the direction we ought to move in, and I have been preaching that gospel for a long time.

The real question is, as I see it now, does it make much sense for the United States to strive for [deleted] when we can't even get our allies up to [deleted].

General **Rogers**. Well, it does to me as the SACEUR and CINCEUR, [deleted] we have in Western Europe among all of our nations, and we have found that we can [deleted].

Senator **Nunn**. Well, from your perspective I would agree with that again. I think that is exactly the position I would take if I were SACEUR, but we have a different responsibility now. We have a responsibility of saying whether America should in effect subsidize all of our allies beyond what we are already doing by going to a much longer war strategy with much more ammunition stockpile to make up for their deficiencies in even meeting what they have already agreed on.

General Rogers. I quite understand your point of view, Senator, but I go back to what are we trying to accomplish? What we are trying to accomplish is to keep the Warsaw Pact from overrunning Western Europe in case it attacks.

I know my perspective has to be different from yours, but I would be looking for help from other nations as well if they had excess in any area over and above what we might have in the United States so that I could reallocate it also.

Senator Nunn. Maybe it would be helpful if you could furnish to us the excesses in other countries that we might be borrowing on, too, so we get some semblance of quid pro quo here.

General Rogers. Well, you and I both know that the old pump starts sucking air very quickly on that one, Senator. [Laughter.]

Senator Warner. Thank you, Senator Nunn.

Senator Nunn. Thank you.

Senator Warner. We have some questions which will be submitted to be answered for the hearing record.

[Questions with answers supplied follow:]

Questions Submitted by Senator John W. Warner

ARMS CONTROL

Senator Warner. General Rogers, what priority do you assign to arms control as a component of theater nuclear stability and are you inclined to encourage acceptance of a less than verifiable threat if necessary to get an agreement that moderates, if only slightly, the TNF imbalance we currently face?

General Rogers. Senator Warner, I fully support the December 1979 decision by the NATO Defense Ministers that the proper approach for increasing the theater nuclear stability is through the successful implementation of the dual tracks of verifiable arms control measures and NATO INF modernization. To abandon either track, by accepting less than verifiable reduction agreements on one hand or not implementing our intermediate range nuclear force modernization programs on the other, would further tip the TNF balance in the direction of the Soviets and undermine NATO deterrent strategy.

POLAND

Senator Warner. General Rogers, how do you view the state of the Alliance today in light of the mixed responses provided to date by the Western Europeans to developments in Poland? What import does the role of the Polish Army in suppressing the Solidarity movement have for our assessment of Warsaw Pact forces' reliability in support of Soviet activities, especially in time of war?

General Rogers. In my view, the West has shown a considerable degree of solidarity in condemning the martial law situation in Poland as an unacceptable breach of the letter and spirit of the Helsinki accords. That solidarity has extended to joint recognition in NATO of the Soviet Union's role in precipitating last December's tragic events. On 11 January the North Atlantic Council issued a strong condemnation of the events in Poland and have been joined in that censure by the European Parliament and, for that matter, by many leaders and peoples throughout the world who regard human freedom as highly as we do.

The United States and its allies have responded to the Polish situation with a variety of measures at their disposal. We have differed to a degree only over which measures best serve our common interests in seeking a resumption of the process of reform and renewal in Poland. Those differences are understandable given that NATO is an alliance of equal sovereign nations. However, those differences in specific approach are also far less significant than the renewed unity and sense of purpose the Polish situation has inspired in the Alliance.

As for the Polish Army's loyalty, it was interesting to note the reports during December of the Jaruzelski regime's dependence on the "special police" to conduct the crackdown of Solidarity. The regime was apparently reluctant to test the Army's loyalty. Where it could be avoided, it appears that the Army was not brought into head to head confrontation with the Polish people.

From such indirect evidence in Poland, it would be hazardous to extrapolate, one way or the other, any precise estimate of Warsaw Pact loyalty to Moscow in a wartime scenario. We in NATO certainly cannot depend on Pact disunity in our assessment of the balance, although we can plan to exploit potential cracks in their unity in a crisis or conflict.

Senator Warner. General Rogers, have you seen anything in your briefings on the Soviet counterproposal that can be regarded as a substantive step toward a more stable nuclear balance in Europe or is it simply a play for European public sentiment designed to maintain the USSR's advantage?

General Rogers. I have seen no evidence that the Soviet counterproposal to President Reagan's Zero Option would lead toward a stable, secure nuclear balance in Europe. To the contrary, Soviet actions give clear evidence of their desire to consolidate and legitimize the comparative advantages in intermediate range nuclear systems which they have built up through their aggressive nuclear modernization program.

NATO SLCM

Senator Warner. General Rogers, as you know, under President Reagan's strategic force modernization program substantial numbers of sea-launched, nuclear tipped cruise missiles are to be deployed. Do you expect to have those weapons available to you as a Theater Commander? To what degree do you believe we should be deploying theater nuclear-designated forces at sea by a NATO SLCM program?

General Rogers. The Sea Launched Cruise Missile (SLCM) is being developed and deployed as a strategic system. [Deleted.] I do not anticipate having these U.S. strategic systems assigned to me as theater commander. However, the US strategic nuclear umbrella covers NATO, and constitutes the major portion of our ultimate flexible response option: general nuclear response. [Deleted.] In the deliberations leading to NATO's INF decision, the SLCM option was considered but not selected [deleted] because these systems did not satisfy the political requirements of shared risk and visibility. It is perhaps more important today that we continue to demonstrate alliance solidarity and dedication to the principle of mutual defense as set forth in the North Atlantic Charter. This is particularly true concerning nuclear weapons, which many times in the past have become a divisive factor for the Alliance public. I do not believe that a basically unilateral (U.S.) SLCM force hidden at sea would sufficiently demonstrate Alliance unity in mutual defense; such a force surely does not demonstrate the willingness of the Nations to share the risk of nuclear war to protect the Alliance. For these reasons, I do not believe a NATO SLCM force would have the deterrent value of land based cruise missiles. I fully support NATO's INF decision to deploy GLCM and PII and the U.S. decision to deploy SLCM as a strategic system; however, I do not believe a NATO SLCM force would be appropriate at this time.

THE THREAT OF CHEMICAL WARFARE

Senator Warner. General Rogers, last year in your testimony before this subcommittee you reiterated your long-standing and profound concerns about the threat of chemical warfare being employed by the Warsaw Pact forces against us and NATO allied troops. Has anything in the intervening time caused you to perceive that threat as becoming less severe? Have allegations of Soviet and Soviet-proxy use of chemical and toxin weapons in Southwest and Southeast Asia provided, in your personal judgment, new evidence of the USSR's intention to employ these horrible weapons if it suits their purpose to do so?

General Rogers. There have been no indications whatsoever that the Warsaw Pact chemical threat has lessened. On the contrary, the past year has witnessed the deployment of new, improved chemical warfare equipment into Warsaw Pact forces. Constant equipment improvements and extensive training in simulated toxic environments under field conditions and staff play reinforces my firm belief that the Warsaw Pact's ability to wage chemcial warfare remains an extremely serious threat to NATO. [Deleted.]

The danger to NATO, in my judgment, of the repeated limited use of such weapons in the Third World is that Moscow may develop an increased willingness and confidence to employ chemical weapons in a European conflict.

THE LRTNF PROGRAM STATUS

Senator **Warner**. General Rogers, where do the Dutch and Belgians stand at the moment on the issue of deciding whether or not they will accept GLCM's on their respective soils? Do you hold out any hope that they will move in the direction of participation in the LRTNF plan in the near future? What are the repercussions likely to be of a failure on the part of either of these nations to make such a move? How do things look for continued German participation in light of the decision by Chancellor Schmidt's party to have a vote on the issue in the fall of 1982? How sensitive is that outcome going to be to signs of progress in the Geneva talks?

General **Rogers**. Neither Belgium nor the Netherlands has made a final decision to deploy GLCM in their respective countries. [Deleted.] All deployments of TNF involved in the December 1979 decision by NATO Ministers are linked with progress in the INF talks now underway, since, as you know, the decision was two-track with the second track requiring arms control negotiations of equal effort.

ENHANCED RADIATION WEAPONS

Senator **Warner**. General Rogers, last year you testified about your concerns that the enhanced radiation warhead, the so-called neutron bomb, not be put on the European agenda at this time. Since your appearance, of course, the President has decided to proceed with production of these weapons and their stockpiling in CONUS. What have the repercussions been to date for U.S. interests especially in the area of long-range theater nuclear forces modernization program of this decision? Has it proved to be manageable and, if so, to what degree does non-European deployment of controversial weapon systems follow their production hold out a partial answer to these decisions that so stress the Alliance?

General **Rogers**. Our highest priority must be to deploy the intermediate range nuclear forces, the GLCMs and PIIs. The December 1979 decision to deploy such weapons has placed many of our allies under increasing pressure from anti-nuclear groups to reduce or eliminate all nuclear weapons from Europe. I believe that the President's decision to stockpile the enhanced radiation warhead in the United States is consistent with our current interests in Europe. Proposals to forward deploy enhanced radiation weapons now would provide the anti-nuclear forces additional grievances against the governments of our allies and ourselves and could seriously jeopardize the deployment of the INF. We should not raise the issue of deployment of ERRB warheads with the allies at this time.

In response to the second part of your question, political realities require enhanced radiation weapons be stockpiled in CONUS for the time being. This stockpiling decision, however, is creating a dilemma for the NATO allies. [Deleted.] We must educate our publics to the fact that replacement of the existing short range nuclear warheads with ER will result in a reduction in the actual number of weapons in Europe. These weapons are more militarily effective than existing short range systems and fewer will be produced. Additionally, the reduced blast effects of these new weapons will help limit collateral damage. But now is not the time to propose deployment to our allies. It would only divert their attention from following through on the December 1979 decision.

SOVIET WEAPONS DEPLOYED VERSUS THE PRC

Senator **Warner**. General Rogers, from a Theater Commander's point of view how do you treat the many, highly mobile Soviet weapon systems deployed against the People's Republic of China? Do you regard them as being altogether unavailable for European contingencies, partially available or designed and based in conjunction with a swing-strategy that makes them a significant threat to Europe in any planning contingency?

General **Rogers**. I view the mobile Soviet weapon systems, primarily intermediate and short range ballistic missiles and aircraft, as an integral component of the Soviet forces opposite China. However, these systems could be redeployed to the west in the event of a conflict with NATO, and it is very possible that some would be redeployed.

However, [deleted].

Should a positive fundamental change occur in Sino-Soviet relations we most certainly would reassess [deleted].

TECHNOLOGY TRANSFER

Senator **WARNER**. General Rogers, the Reagan administration has been giving a great deal of attention to the issue of stemming the hemorrhage of high technology from the West and expecially the United States to the East. How high a priority do you give to this problem and how directly does the military application of some of this diverted technology affect you and the forces under your command?

Have you been able to quantify the added difficulty you encounter in performing your mission as a result of the added mobility afforded Soviet forces thanks to Kama River Engines, the improved accuracy of the USSR's ballistic missiles as a result of U.S. ball bearing technology, et cetera?

General **ROGERS**. I place a very high priority on this matter. The Soviets have obtained Western designs, test data, production know-how, and actual hardware and have used such to develop new weapons and to improve existing ones.

In general, the acquisition of advanced technology has allowed the Soviets to: [Deleted].

I view any increase in Soviet weapon system accuracy or efficiency or any improvements to their systems to counter our weapons of serious concern to this command. Some general areas in which the transfer of Western technology has military impact on our forces are the: [Deleted].

Although it is difficult to quantify the improvments in Soviet force structure directly resulting from technology transfer, it is clear that the Kama River Truck Plant has played a significant role in Soviet logistical improvements.

Among Soviet forces in East Germany, for example, the cargo lift capability of front- and army-level transport units has increased 25–35 percent since 1978 largely as a result of incorportion of KAMAZ trucks. These vehicles have also been [deleted].

In reference to the accuracy of Soviet ballistic missiles and rockets, the following chart depicts this increase although we cannot be certain as to what exact role the transfer of Western technology has played.

[Deleted.]

THE UNITED KINGDOM'S NUCLEAR DETERRENT

Senator **WARNER**. General Rogers, to what degree are you involved in or cognizant of the United Kingdom's discussions with the U.S. Government about the purchase of the Trident missile system as a replacement for her aging Polaris missile fleet?

Do you regard the decision of the British Government to modernize its deterrent by procuring sea-launched ballistic missiles apparently, to some extent, at the expense of conventionai forces, rather than through the acquisition of sea-launched cruise missiles?

How important do you believe the outcome of these procurement decisions and their impact on British force structure to be to the UK's contribution to NATO?

General **ROGERS**. I am aware of the United Kingdom's plans to acquire Trident but I am not involved in the bilateral arrangements between the United States and United Kingdom.

British contributions to NATO's nuclear and conventional force capabilities are important to the Alliance. There are also uniquely British national security considerations involved in the British decision on Trident. I have no basis for questioning British priorities following the very thorough and difficult defense review Her Majesty's Government has undertaken.

That defense review announced adjustments to British midterm plans for land, sea, and air forces. Some reductions, particularly in their maritime forces, are of concern. Overall, however, the British contribution remains one of the highest in the Alliance relative to GNP. I am confident that the United Kingdom will continue to fulfill her share of the NATO defense burden.

THE BINARY PROGRAM

Senator **WARNER**. General Rogers, you have frequently endorsed the initiation of production of binary chemical weapons to replace the obsolescing agent and munitions currently comprising a large percentage of the U.S. retaliatory stockpile. I assume you believe that President Reagan's decision to take this step is an appropriate and needed one?

Do you feel that we should await the permission of our European allies to the deployment of binaries on their soil before we begin production?

How do you feel as the Senior U.S. European Theater Commander about having binaries stockpiled in the United States and only introduced into Europe in the event chemical attacks were initiated by the U.S.S.R.?

General **Rogers**. I believe the decision to produce the binary munitions is appropriate and was necessary. Currently, the Soviets have a chemical weapons system against which our only effective response may have to be nuclear weapons. Further, our overall objective should be the destruction and banning of all chemical weapons from the face of the earth. But the Soviets have had no incentive to negotiate toward such an objective since we have been negotiating from a position of weakness and they from strength. By starting production of binary weapons we are establishing not only adequate retaliatory capability by which to deter Soviet use, but also providing an alternative to retaliation by providing more incentive for the Soviets to negotiate chemical arms limitations. [Deleted.] I do not believe deployment should be a prerequisite to production. The fact that we are going to produce the binary tells the Soviets we are serious about countering the threat and are developing an adequate and modern retaliatory capability by which to deter Soviet use. [Deleted.] We must, however, be prudent in the political and military risks we ask our allies to accept. We are today involved in a massive effort to deploy the INF which has top priority. Adding the politically sensitive issue of chemical munitions would be more than the allied publics can accept at this time. We must proceed with our force modernizations deliberately and we must educate both our and the Alliance publics to the issues as each step is taken.

Meantime, production of binary rounds by the United States will send the appropriate signals to the Soviets that we intend to retaliate if they use chemicals against us. Thus, we would have a situation similar to that in WWII in which both sides possessed chemical weapons but neither side used them for fear of retaliation.

NATO POLICY RE CHEMICAL WARFARE

Senator **Warner**. General Rogers, would you describe for the committee the nature ot the North Atlantic Treaty Organization's formal policy with regard to chemical warfare?

Is it correct to say that official NATO guidance is that the Alliance will retain a retaliatory capability and that, notwithstanding this agreed policy position, only the United States today has any such capability?

How many countries in the NATO Alliance have adopted a unilateral policy forswearing the use of chemical weapons, even in retaliation for an attack employing them against that nation's troops?

General **Rogers**. [Deleted.]

All NATO nations are parties to the 1925 Geneva Protocol prohibiting the use of chemical weapons. Of the NATO nations, only the following reserved the right to retaliate with CW: Belgium, Canada, France, Netherlands, Portugal, U.K., and the U.S. However, all nations retain the legal right to retaliate based on the recognized international law principle of reciprocity.

FORWARD BASED SYSTEMS

Senator **Warner**. General Rogers, would you provide for the classified record a detailed breakout of the number, type, and capability of the various Soviet and Warsaw Pact weapon systems which would be comparable to those western European and U.S. forces the Soviets refer to as "Forward based systems?"

General **Rogers**. The term "Forward Based Systems (FBS)" has been used by the Soviets to refer to those U.S. nuclear systems based in third countries or on aircraft carriers and capable of delivering a nuclear strike against the territory of the USSR.

The Soviets have claimed that there exists a "rough balance" between the Soviet Union and NATO in those nuclear systems "stationed in Europe, the water basins washing Europe, or intended for use in Europe, that have a [deleted]." By the Soviet count, the NATO countries have [deleted] similar systems.

[Deleted.]

The Soviet count presented above is not consistent with their FBS claim. Using the Soviet definition of "FBS", [deleted]. Therefore, by Soviet count, U.S. "FBS" in Europe would amount to [deleted] aircraft versus [deleted] similar Soviet systems. The U.S. "FBS" total should further be reduced to a total of [deleted] which is not capable of reaching Soviet territory from operational bases in Europe and by counting only [deleted]. In addition, the actual balance is even more one sided in favor of the Soviets because they fail to include a sizable portion of their Badger and Blinder aircraft forces which are stationed in Europe.

Using the Interagency Intelligence Memorandum (NI IIM81-10025, Dec 1981) a more accurate portrayal of U.S. "FBS" and "similar" Soviet systems in Europe in 1982 using Soviet counting rules is as follows:

[Deleted.]

SUMMARY

Based on U.S. estimates and the definition of "FBS" as defined by the Soviets themselves, U.S. FBS systems in Europe total [deleted] while comparable Soviet systems total [deleted] missiles and aircraft.

[Deleted.]

EARTH PENETRATING PERSHING II

Senator **Warner**. General Rogers, during a recent inspection tour of the Department of Energy weapons complex I had occasion to receive a briefing on the planned, but now shelved, earth penetrating warhead for the Pershing II missle.

To what degree do you believe in your own personal judgment that a requirement exists for such a weapon in the US inventory, especially in light of continuing hardening of Warsaw Pact command and control facilities and the rapid capabilities for airfields?

General **Rogers**. An analysis by the USEUCOM staff indentified less than [deleted] which could be uniquely attacked by the Earth Penetrator (EP). These potential targets were either not of sufficient high priority to justify development and deployment of a unique warhead for PII, or the desired [deleted].

The damage a nuclear weapon will do to a target is determined by two factors: the yield of the warhead and the accuracy with which it is delivered to the target. The PII promises to be the most accurate [deleted] delivery system in the inventory. Our analysis indicated that due to its very high accuracy, relatively low yields [deleted] of air/surface burst weapons provided the desired damage assurance to most of the potential targets. The air/surface burst warhead is also more versatile than the EP warhead, permitting much greater targeting flexibility. Considering the limited of 108 PII on launchers, and the potential high priority targets, we were [deleted].

In the broader view, an EPW on another delivery system could be of value. Earth penetrators, with high accuracy, do provide significantly improved capability to attack very hard targets and to close choke points created by the terrain. I believe we should maintain the technology and the capability to produce and deploy these warheads at some future time if the number of very hard targets continues to increase. I do not believe it would be either cost or militarily effective to deploy these warheads now as part of the 108 PII in the INF modernization program.

Questions submitted by Senator Sam Nunn

SECOND ECHELON ATTACK

Senator **Nunn**. General Rogers, the Army Training and Doctrine Command has developed new doctrine for the Army as embodied in the Air/Land battle plan that envisions a greater emphasis on "maneuver" and on second and third echelon attack capability. What is your view as NATO Commander of this plan, what type weapon systems are needed, which are in development, and what are our allies prepared to do to support this concept? Can the United States adopt this doctrine if our allies do not?

General **Rogers**. Targeting, interdicting, disrupting, and destroying the Warsaw Pact "follow-on forces" are fundamental to our maintaining a coherent conventional defense. Assuming their troops are fully deployed in their defensive positions and adequately supported by air assets, my corps commanders can cope with the Warsaw Pact lead echelon for a time. However, with the Warsaw Pact's greater depth of forces there is a strong potential for breakthrough with sufficient fresh units to cause the cohesiveness of our conventional defense to be lost. Therefore, I must be able to target and destroy the enemy follow-on forces.

Regarding the types of weapons needed, I must point out that the requirement is broader than just specialized weapons. We must have adequate near real time intelligence information, an ability to analyze all such information in order to plan strikes, and effective C^3 systems by which to communicate those plans on a timely basis. We need the Battlefield Exploitation and Target Acquisition (BETA) system (often referred to as the Joint Tactical Fusion System) into which all appropriate intelligence collection systems, such as TR-1, SOTAS, PAVE MOVER, and national systems, make input. In the weapons category we need munitions, as planned for ASSAULT BREAKER, that are effective against mechanized and armored units. These munitions would include weapons with terminally guided submunitions, both air launched and ground launched.

SHAPE has developed the concept for attacking the follow-on forces which will become the doctrine for Allied Command Europe. Our allies can support it now. [deleted.] However, there is nothing in the concept which is contrary to established NATO strategy. What the US must do is take the lead in developing the targeting, C^3, and weapons systems which will make the concept a viable one within ACE.

SLCM

Senator NUNN. General Rogers, what is your view of the plan to put nuclear land attack cruise missiles on U.S. attack submarines and do you plan for employment of these weapons as part of your integrated tactical nuclear battle plan? I understand that these weapons are not part of the U.S. SIOP except in a strategic reserve force.

General ROGERS. The Sea Launched Cruise Missile (SLCM) is being developed and deployed as a strategic system. [Deleted.] I do not anticipate having these U.S. strategic systems assigned to me as theater commander. However, the U.S. strategic nuclear umbrella covers NATO, and constitutes the major portion of our ultimate flexible response option; general nuclear response. [Deleted.]

In the deliberations leading to NATO's INF decision, the SLCM option was considered but not chosen [deleted] because these systems did not satisfy the political requirements of shared risk and visibility. It is perhaps more important today that we continue to demonstrate alliance solidarity and dedication to the principle of mutual defense as set forth in the North Atlantic Charter. This is particularly true concerning nuclear weapons, which many times in the past have become a divisive factor for the Alliance public. I do not believe that a basically unilateral (US) SLCM force hidden at sea would sufficiently demonstrate Alliance unity in mutual defense; such a force surely does not demonstrate the willingness of the Nations to share the risk of nuclear war to protect the Alliance. For these reasons, I do not believe a NATO SLCM force would have the deterrent value of land based cruise missiles. I fully support NATO's INF decision to deploy GLCM and PII and the US decision to deploy SLCM as a strategic system; however, I do not believe a NATO SLCM force would be appropriate at this time.

SWING FORCES

Senator NUNN. General Rogers, there has been a great deal of comment about the future of NATO lately and a number of suggestions about how we can improve NATO from withdrawing a portion of US forces there to earmarking those forces as a "swing force" to be used on the current situation and the various suggestions such as the two mentioned above?

General ROGERS. As you know, a swing force is one assigned to one theater but having contingency missions in other theaters. It can also be a force which divides its time between theaters and has a mission in each. NATO currently has a Carrier Battle Group with the Mediterranean Amphibious Ready Group/Marine Amphibious Unit dividing its time between the Mediterranean Sea and Indian Ocean. NATO capability to conduct combat operations is clearly degraded during the swing forces out-of-theater deployment. However, the forces' presence in the Indian Ocean serves as a deterrent to Soviet adventurism in the Mid East oil fields and provides a ready capability to protect the flow of oil on which NATO depends. Even though the force may be deployed out of NATO, it does further the interests of the Alliance. The best situation is to have adequate forces to do both tasks; in the absence of adequate forces, SACEUR must assert the right to have a voice in any swing force "out-of-theater" missions. [Deleted.]

AMBIGUOUS WARNING

Senator NUNN. General Rogers, Secretary Weinberger has included in his posture statement a lengthy discussion of warning and mobilization. He states we have to change our policy for reacting to warning, especially ambiguous warning. What is the status of the NATO project on a study of responses to ambiguous warning and what is your view of this thrust from a tactical standpoint?

General ROGERS. The NATO Response Improvement Study, encompassing responses to both direct and ambiguous warnings, was completed in December 1981. It is a dynamic document to be refined in the light of experience and of exercises. In preparation for a follow-up report to the Ministers in May of this year, the Military Committee has requested the views of the Major NATO Commanders on the question of the ability to repeat and sustain the various response improvement measures.

From a tactical standpoint, I believe this effort to lay out the military measures at our disposal in response to ambiguous warning will reduce consultation time and improve our ability to respond more quickly and effectively.

LONG-TERM DEFENSE PLAN

Senator NUNN. General Rogers, how well is NATO doing implementing the long-term defense plan and what is your view on how we can, if needed, revitalize this effort? Could you provide for the record your assessment of those elements in the long-term defense plan and how NATO is doing meeting those goals (this can be December report)?

General ROGERS. In January Secretary Weinberger submitted to Congress the eighth annual report on Force Improvements and Defense Cooperation within NATO. This report includes an excellent assessment of progress in implementing the LTDP and I agree with it. In order to achieve fully the objectives of the LTDP and other needed Alliance improvements, nations must spend more on defense. In my view, for NATO as a whole, an annual real increase of about 4 percent is required to fulfill the 1983–88 Force Proposals which are directed almost exclusively to the improvement of our conventional capability. Fulfillment of these proposals by our nations will enhance our deterrence and raise the nuclear threshold.

An adequate defense of the West is affordable and I believe the public will pay this price or even more if they are convinced that it is really necessary. Our task as leaders then is to make a convincing argument to our taxpayers in all our Nations that the threat is real and that resource allocations of this magnitude to defense are required.

CHANGE IN DEFENSE POLICY

Senator NUNN. General Rogers, what is your impression of any changes in defense guidance in this Administration related to our overall defense strategy, in particular I am interested in your views on the "war-widening" options and the shift to long-war planning? Do these policies make sense and, if so, what type of resources are needed to implement them or what impact do they have on our forces and those of NATO?

General ROGERS. [Deleted.]

The strategies are complementary to our interests in NATO.

Senator NUNN. General Rogers, Secretary Weinberger has included in his posture statement a critique on the short-war theory, especially for NATO. He states, "Another warfare has been the "short war" assumption, the notion that in planning our strategy and designing our forces we could rely on the assumption that a conventional war would be of short duration. I have instituted changes in our defense policy to correct this fallacy."

I have two questions. First, what is your view on his approach as it has been explained to you and, second, does this represent a unilateral approach or have the NATO allies signed off on programs to improve sustainability?

General ROGERS. I consider Secretary Weinberger's approach to be correct and long overdue. By providing resources adequate to sustain our combat forces in conventional conflict of longer duration, we not only provide additional credibility for the forward defense concept, but also increase the prospects with the same investment—that the operational commanders in the field have the flexibility and sustainability to conduct a successful conventional defense and thereby raise the nuclear threshold. In answer to your second question, it does not represent a U.S. unilateral approach. Other NATO nations have recognized significant deficiencies in the logistic sustainability posture of their armed forces committed to NATO. The NATO Long Term Defense Program (LTDP) resulting from the Task Force Nine report is an attempt by the Alliance to recognize and redress some of these shortfails. Expanded national expenditures are required to meet the LTDP requirements for increased pre-positioned war reserve material stocks in the various critical classes of supply, for example. The various nations are addressing these problems of resource allocation.

SUSTAINABILITY

Senator **Nunn**. General Rogers, I have a general question on conventional sustainability and then I would like to have several items for the record.

In general, what is the current capability of the United States and our allies to support the type of conventional conflict envisioned for NATO center? In other words, what are our objectives in terms of ammunition and war reserves and what do we currently have available? What is in the five-year plan and what are the major deficiencies?

General **Rogers**. The long-term planning goal is to sustain our general purpose force [deleted] using the least-cost combination of war reserves and production base investments. This concept is comonly known as "D-to-P planning" or approximately [deleted] support in the most demanding scenario. Recognizing this goal is [deleted] the fiscal year 84–88 Defense Guidance directs the services to program the following war reserve levels [deleted].

All Services.—(a) Munitions, spares, and secondary items through [deleted]; (b) bulk petroleum varies by service and region; however, equates most commonly through [deleted].

Army.—Major equipment items: days [deleted] days [deleted].

Air Force.—[Deleted] procure A/C support equipment for [deleted].

USMC.—[Deleted.] Current status of major classes of PWRMS in days of supply (DOS): [deleted]. The current FYDP, if adequately funded in each successive annual budget through the end of fiscal year 1988 FDP, would satisfy war reserve requirements for all major classes of supply except [deleted]. It has been our experience; however, that the substantial funding necessary to achieve our war reserve objectives . . . remains perpetually in the out years of each succeeding FYDP, resulting in piecemeal treatment of symptoms without effecting an overall cure. While we have been able to maintain a credible deterrent force, it will require substantial support from Congress and the Services . . . in each forthcoming budget year . . . to redress European theater sustainment shortcomings. Resolution of sustainment problems would increase Central Region defense options, raise the nuclear threshold and provide the administration with a stronger bargaining position for reduction of tactical nuclear weapons in Europe.

Questions Submitted by Senator Carl Levin

TRADE NATO FOR WARSAW PACT?

Senator **Levin**. General Rogers, last year I asked each of the service chiefs whether he would trade his service and its allied counterparts, weapons, personnel, missions, entire range of capabilities, strengths and weaknesses, for its Soviet and other Warsaw Pact counterpart services. Each of the service chiefs answered with a resounding "No."

On these criteria, comparing the two opposing alliances and their respective military capabilities would you trade NATO's military strengths and weaknesses for that of the Warsaw Pact?

General **Rogers**. I was once asked a similar question by an interviewer—whether I would trade places with my counterpart commanding Warsaw Pact forces. My answer today is the same, "No." Although I would very much like to see the disparity in Europe in numbers of WP forces and their sustaining logistical support reduced so that we in NATO could be more assured of our deterrent, there are other factors that weigh in the balance: We are defending freedom, democracy, the rule of law, human dignity and all the values we hold so dear in the West. Marshal Kulikov would be fighting for totalitarianism, secret police, censorship, labor camps and the suppression of individual freedom and human rights.

I would hate to go to war depending on forces to be loyal to his nation's values against a determined Alliance defending ours.

Senator **Levin**. General Rogers, under the 5-year defense program submitted by the Administration will you be able to carry out successfully assigned responsibilities in defending NATO Europe? If not, in which mission responsibilities will you fail?

General **Rogers**. The forces of U.S. European Command are the forward deployed commitment of the U.S. to Allied Command Europe (ACE). Their role, along with the forces of our allies, is to deter war by maintaining the capability to inflict unacceptable losses on a potential aggressor. They must be prepared, should deterrence fail, to combine with their reinforcing countrymen and the other forces of Allied Command Europe to conduct a successful forward defense of Western Europe.

Our challenge in military terms is to make our deterrent strategy of Flexible Response viable and credible by providing adequate capabilities for each leg of the Triad of forces that strategy requires.

While there is no reason for complacency regarding the two nuclear legs of the Triad, the NATO nations have collectively recognized the need to improve each of them and have begun to act. Remaining is the third leg: conventional forces. It is with regard to their role in the strategy of Flexible Response, and our ability to fulfill that role, that I have very great concerns.

ADDITIONAL REQUIREMENTS

Senator LEVIN. General Rogers, what additional spending for what specific programs in each of these five fiscal years, especially fiscal 1983, would be needed to enable you to carry out your assigned missions in NATO Europe?

General ROGERS. As I said in response to your previous question, there is much in the Five Year Defense Program that will improve our capabilities in EUCOM, and I am grateful for that support. Even with these improvements, though, there are problems which cannot be overcome without additional funding in many areas, especially those of readiness, reinforcement and sustainability. Shortfalls in these vital areas reduce the effectiveness of our deterrence today, and could seriously impede the conduct of a successful defense.

Readiness is a function of several variables: manning, equipment, training, and deployment. Together, these variables determine our forces' ability to respond to challenges, whether with short warning or hostilities arising from an extended period of international tension.

As most of you understand, our personnel must have first priority. Those of you who have visited our forces in Europe can attest that many of our units, especially Army units, are being asked to maintain their modern weapons systems in facilities which are clearly inadequate. It is not realistic to expect soldiers to achieve high readiness rates under these conditions, and it is a testimony to their pride and diligence that they do so anyway.

This problem of facilities continues to plague us. Our backlog of maintenance and repair requirements has now reached the $1.5 billion level, and because of the increasing age of our facilities and inflationary pressures, projects are entering the backlog list at a growing rate.

BMAR is one part of the larger issue of adequate Operations and Maintenance—or O&M—funding. As you know, the O&M appropriation is our life blood because it supports a variety of program elements essential to Quality of Life and personnel readiness.

A related problem, which is not covered by our O&M funding, is the lack of sufficient family housing for U.S. forces in Europe, especially Army personnel. Soldiers in Europe must still face long waiting periods, or leave their families behind when they come to Europe. The worries of family separation and the turbulence caused by extra family relocations both degrade personnel readiness.

In the field of equipment, I am pleased with actions which will hasten the delivery of modern weapons, such as the M-1 tank, to Europe. The continuation of funding for chemical warfare projects has also been most welcome. A resolute United States stance on chemical warfare will pay dividends not only in the future safety of American service personnel but those of our allies.

To fulfill major equipment needs for the future, we must press ahead with the development of target acquisition systems which will allow us to locate, well beyond the forward edge of battlefield, the reinforcing elements of hostile forces. To exploit these acquisition systems, we must have responsive intelligence analysis and fire control systems, and accurate conventional weapons of sufficient range to reach these targets. Together, these systems will give us the potentially decisive capability to attack and destroy enemy follow-on forces by conventional means before they reach the battle area.

We still have deficiencies in the areas of air defense; electronic warfare; command, control and communications systems; munitions and barrier and denial systems. Weakness in any of these areas degrades our overall readiness.

We are making what I believe is significant progress in upgrading our reinforcement plans and capability. We have entered what will be a laborious process of knitting together the assets and requirements of the European allies with those of the United States. We expect that the end result of this process will be a solution which is more effective and capable of rapid and flexible response to varying threats than is presently the case. To be able to reinforce on as rapid a scale as will be required, we must continue to fill our POMCUS for six Army divisions (and related support forces) and for the Marine MAB in Norway, continue to fill our pre-positioned war reserve stocks, and continue to increase our strategic air and sea lift.

In this regard, the restrictions on procurement of tool kits, load list items and transportation of equipment for POMCUS Division Sets 5 and 6 contained in the fiscal year 1982 Defense Appropriations Act (PL 97-114), were a major setback to this essential program. These restrictions must be removed if the U.S. is not only to fulfill its commitment to NATO, but also provide on a timely basis the required reinforcing units.

One facet of our Rapid Reinforcement Program which I wish to highlight is the Collocated Operating Base (COB) program. This program makes available for use by reinforcing U.S. aircraft facilities excess to host nation needs at strategically located airfields in Europe. These facilities are essential to effective use of our augmenting air forces. At these airfields there must be Minimum Essential Facilities (MEF) available for our reinforcing aircraft to include ammo and fuel storage for initial operations, plus adequate ramp space for dispersed aircraft parking. Although access to COB's provides a variety of otherwise unavailable facilities, these bases typically have little excess MEF beyond host nation wartime needs. Unfortunately, because of the limited NATO funding available and a U.S. reluctance to prefinance this effort, we are at present able to support with MEF only a small fraction of the U.S. air reinforcements that deploy to COBs. I urge the Congress to approve funding to complete the Minimum Essential Facilities portion of the Collocated Operating Base program. It provides an excellent return on our investment, since it gains access to some $2.55 billion worth of airfield facilities at a cost of $289 million. Completion of this program would significantly increase our ability to reinforce NATO in a timely and effective manner.

In the area of sustainability of our forces, we face a difficult problem. We must be able to fight conventionally—and successfully—for as long as our potential enemy in order to avoid being forced into early escalation to the use of nuclear weapons. In the area of manpower, the US Individual Ready Reserve continues to lack a sufficient pool of Army personnel trained in combat and medical skills, who would be immediately available at mobilization to fill Active and Reserve units to wartime strength and to serve as replacements for battlefield casualties until the draft could take over and provide a steady stream from the training command (about 4 months with draft registration in effect). I am most uncomfortable with the knowledge that the US Army will exhaust its supply of replacements for combat personnel losses sustained by our divisions in a NATO-WP confrontation before the draft can take up the slack, even if the draft is implemented by the Congress as soon as we mobilize.

On the materiel side of sustainability, I urge continued Congressional action in the filling of our Pre-positioned War Reserve Materiel Stocks (PWRMS) and at the same time, suggest a continuing close examination of the ability of the US industrial base to gear up for wartime defense production in the timely manner required in today's world.

MARITIME STRATEGY

Senator Levin. General Rogers, one of the major tenets of the maritime strategy, at least as indicted by Navy Secretary John Lehman, is that the Navy will seek to protect the sea lines of communication between here and NATO Europe by offensively striking the Soviet Navy near its heavily defended fleet bases. Secretary Lehman contrasted what he considers this more aggressive strategy with what he termed the "laid-back, Carter" strategy for protecting the SLOCs to Europe.

In this, I assume he was implying that the last Administration's strategy for protecting the SLOCs was more defensive-oriented, relying more on ships and aircraft capable of establishing anti-submarine, anti-aircraft and anti-cruise missile barriers between the Soviet Navy and our European reinforcement convoys.

Do you agree with this shift in naval tactics, and do you think it is the least risky way for us to ensure that your command in Europe is resupplied when needed?

General Rogers. That is a question I believe could be answered best by Admiral Train, SACLANT, whose responsibilities include the protection of the sea lines of communication between the U.S. and Europe.

Senator Levin. General Rogers, do our allies' senior military officials have any reservations as to whether this is the least risky and the most effective way for us to protect the SLOC's?

General Rogers. You might want to put this question to Admiral Harry Train who bears national and NATO responsibilities for the Atlantic sea lanes protection mission. I believe he would say that the most effective way for us to protect the

Atlantic sea lines of communications is to win the sea battles as far forward as possible to include destruction of major enemy naval installations. The question is not one of risk but of whether the Alliance has enough naval power, once we are attacked, to seize the initiative and simultaneously protect the sea lanes. To do both with a high degree of confidence, we need more maritime assets.

Our allies have not expressed to me any reservations about the desirability of a forward strategy. You must understand that a defensive sea strategy that refrains from attacking Soviet maritime bases would leave several of our European allies, plus some of our own troops, exposed to attack. Once a conflict has begun, our ability to control the North Atlantic and the Norwegian Sea will be vital not just for the defense of US-European sea lines of communications but for the territorial defense of Norway, the United Kingdom, Iceland and Canada as well.

Senator LEVIN. General Rogers, since we and our NATO allies have been building ships, and training with them, based on an allegedly less aggressive strategy to defend the SLOCs, according to Secretary Lehman, will this shift create problems for our allies' navies by requiring changes in operations, training, tactics and the ships and weapons they are or will procure?

If so, will our allies accept the need for these changes and implement them?

General ROGERS. The most pressing Alliance shortfall in the maritime area continues to be the shortage of ships and aircraft. I do not believe additional problems for our allies' navies will result from a more aggressive U.S. maritime strategy, because the inherent flexibility of naval forces makes them adaptable to use in a variety of strategies.

While qualitative improvements in our naval forces continue to be made, these improvements cannot compensate for the lack of numbers. The Alliance, other than the United States, is not doing as well as I would like to lessen the shortfall in our maritime forces.

Senator LEVIN. General Rogers, with its possibility for diverting resources away from defending either NATO Europe or the Persian Gulf, the maritime strategy would also seem to require increased efforts, budgetary and militarily, by our allies to "fill in the gaps" in these regions by our strategy shift.

Aren't the prospects for such increased efforts unlikely, considering the limited success we have so far had with convincing our allies to increase their efforts in Europe to fill in any gaps created by the expansion of our defense commitments under the last Administration to defend the Persian Gulf?

General ROGERS. Based on the performance of some allies in recent years, the prospects for increased budgetary and military efforts do appear unlikely. However, rather than prejudge allied actions, we should measure allied performance by how they meet the 1983-88 force goals. In summary, I would say that increased budgetary and military efforts will be very difficult for our Allies unless the message is gotten across to their people that additional resources need to be committed to NATO.

ALLIED DEFENSE CONTRIBUTIONS

Senator LEVIN. General Rogers, do you think the American people should be satisfied with the level of contributions our NATO allies currently are making to support our forces in Europe?

General ROGERS. The subject of Alliance support to U.S. forces is a broad one, with many of the elements not readily apparent to the public. Many of our Allies furnish us bases, buildings, and access to facilities at low or no cost. We have recently completed an agreement with the West German government which will provide over 90,000 men to assist U.S. forces should we have to reinforce our forces already in Europe. Although there are areas which could use improvement—we would like to relocate some of our facilities and are having trouble doing so—I would say that the American people can be satisfied with the support our allies give U.S. forces in Europe at this time. But at the same time, our allies, in many cases, should do more to enhance their own defensive capabilities. It does no good to have effective and well supported U.S. forces if our allies are not equally effective and well supported.

NATO DEFENSE CONTRIBUTIONS

Senator LEVIN. General Rogers, should they be satisfied with the efforts our allies are making to improve their own defense capabilities through increased defense spending?

General ROGERS. I have said that, as an Alliance Military Commander, I am not satisfied with the defense contributions of the member nations of the Alliance. We have identified those deficiencies which need to be corrected and those programs which must be completed for an adequate deterrent. The cost of this deterrent is high, but it is within the reach of each nation. Before we judge our allies too quickly, however, we must remember that while we in the United States were recovering from the Vietnam War, our European allies were steadily making considerable contributions to defense. Now is no time to squabble about who is doing more. Rather, we must now unite the efforts of all our nations to meet the common challenge.

Senator LEVIN. General Rogers, recently it was reported that NATO's military commanders had agreed that each member nation needed to increase its annual defense spending by four percent in real terms in the future. Considering the limited success we have had in obtaining three percent real growth annually in allied defense budgets, why do you think there is any reason to hope that greater defense spending will occur in the future?

General ROGERS. I believe that there is reason to hope for increased Alliance defense spending in the future because I believe that the nature of the threat which we face as an Alliance is becoming more evident. The outward signs of Soviet intentions—the Afghan invasion, the pressure on Poland, the expanding interest in the Western hemisphere—all are difficult to ignore. I also believe that as we do a better job in informing our publics as to the nature of the threat, some—if not many—of the unconvinced will see the need for increased expenditures. The example which the United States has set in its provisions for defense is needed to show the way. All our nations need to carry through on enhanced readiness, force improvements and modernization which are included in the force proposals for 1983-88 now before NATO's political authorities for approval.

Senator LEVIN. General Rogers, last year I asked the Chairman of the Joint Chiefs, General Jones, how Congress, DOD, the JCS and the President could work together to press our allies in NATO Europe, and the Japanese, to increase their contributions to the mutual defense.

He responded: "In all fora, we must individually and collectively work together to convince them of the growing threat, the vulnerabilities, and the need to do more."

What would be your response?

General ROGERS. My response would be that General Jones has hit the nail on the head. I frequently tell European leaders that a major part of their responsibilities includes informing their publics accurately about the nature of the threat. I think a parallel problem is that many people—almost all of those under 35—have no idea about the alternatives to defense. They have enjoyed free and democratic societies with unparalleled prosperity. Because they are familiar with those benefits which come from social programs, and unfamiliar with the results of a weak defense, they find it difficult to understand why defense expenditures are necessary. For those who have seen the horrors of war, an adequate defense is worth whatever it costs.

Senator LEVIN. General Rogers, would organized Congressional expressions of such sentiments, such as sense of the Congress resolutions, help in this regard?

General ROGERS. Very definitely, particularly if they dealt with the growing threat and the need to meet it. I know the leaders and shapers of public opinion in the NATO nations take great interest in what our Congress does and says, especially regarding issues bearing on the defense of Europe. I should add, however, that expressions by the Congress of intent to withdraw forces from Europe would not have a desired effect at this time. What now is needed is for all allies to do more, not for any to do less.

SUSTAINABILITY

Senator LEVIN. General Rogers, 2 weeks ago the Chairman of the Joint Chiefs, General David Jones, told our committee that the five-year plan in the defense budget to improve the sustainability of our forces the number of days they have sufficient ammunition, fuel, spare parts and other supplies to be able to continue to fight does not accomplish this objective as quickly as desirable. Do you agree?

General ROGERS. Yes.

Senator LEVIN. General Rogers, what are the sustainability needs which are not adequately and rapidly enough addressed in this 5-year defense program, especially in the fiscal year 1983 budget? Please provide yearly data.

General ROGERS. As I mentioned to Senator Nunn, the Army can achieve [deleted]. This problem, as well as other service programs to redress sustainability shortcomings, will require further analysis in the coming months. As you are aware the service POMs, as well as the fiscal year 1983 budget, reflect service-wide acquisition programs that encompass the needs of active and reserve forces, all theater needs; i.e., NATO, Korea, RDJTF, as well as programs for POMCUS, and war reserves. How much of the supplies and equipment, purchased in fiscal year 1983 and succeeding budget years, will actually wind up in war reserves will be subject to service distribution plans developed for each budget year. I am confident the services will adequately allocate resources in accordance with established priorities.

Senator LEVIN. General Rogers, what are our allies sustainability goals for their forces? How does their current capability to wage a conventional war compare to ours in days of supply? How do our allies' sustainability posture affect our planning and strategy?

When do you expect our allies to reach even the NATO approved sustainability level, if ever?

General ROGERS. The NATO sustainability goals agreed in the LTDP are [deleted] day stocks of ammunition and end items and [deleted] day stocks of POL. In general allied stocks are lower than current U.S. stocks. As I have said repeatedly, both here and in Europe, in order to effectively execute agreed NATO strategy, our conventional force posture, particularly sustainability, must be improved. Current sustainability is well below the levels I would be comfortable with, and, at present rates of improvement, the Alliance as a whole will not reach desired stockage levels [deleted] although a few nations are making more rapid progress.

CHEMICAL WEAPONS

Senator LEVIN. General Rogers, have the senior civilian and military organizations in NATO, the North Atlantic Council, the Defense Planning Committee and the NATO Military Committee, all formally agreed that NATO's present offensive chemical capabilities are inadequate and that the U.S. needs to produce binary chemical munitions to address this inadequacy?

General ROGERS. There has been no formal agreement by the senior levels of NATO on NATO's CW capability as stated, but unofficially the U.S. decision to modernize its CW capability with binary munitions is supported as a means of replacing an aging stockpile.

Senator LEVIN. General Rogers, have the senior military and civilian groups in NATO agreed with the U.S. JCS established requirement for the number of tons required in our chemical weapons to quantifying CW stockpile requirements.

General ROGERS. To my knowledge, there have been no discussions in NATO relative to quantifying CW stockpile requirements.

Senator LEVIN. General Rogers, last year you stated "In the last several years we have made significant progress in the chemical defensive training of U.S. and Allied forces." However, you continued: "The situation is totally different concerning chemical retaliatory operations training. [Deleted.] A major problem in [deleted] is the political concern of some of our allies. [Deleted]. We are attempting to resolve this issue within NATO." Has this problem been resolved? Are you now making any progress in this training?

General ROGERS. The problem has not been resolved. While some improvement has been registered by nations in this training process, we are still far from meeting basic requirements.

Senator LEVIN. General Rogers, if little progress has been made in training our allies to operate during the use of U.S. retaliatory chemical weapons, binary or otherwise, of what utility is an expanded chemical weapons stockpile of binary munitions?

General ROGERS. Our goal is that defensive capabilities against CW among the Allied nations, coupled with comprehensive training programs, will be realized in the near term. This will provide the assurance that NATO forces are able to operate effectively within a CW environment.

Senator LEVIN. General Rogers, during a NATO conflict there will be extreme demands placed on our limited airlift resources to resupply Europe. Priorities will have to be assigned to equipment, personnel and supplies so that reinforcements will be delivered in order of importance.

Please provide a rank listing of what are the priorities for use of our limited airlift in resupplying Europe.

What priority will be assigned to shipping any chemical munitions stored in the United States?

Will there even be sufficient airlift assets available to ship within times required chemical munitions along with all the other categories of supplies needed in Europe?

General ROGERS. As you know, [deleted].

M-1 TANK

Senator **Levin**. General Rogers, some in Congress are suggesting that we delay production and fielding the M-1 tank in fiscal 1983 while we continue testing it. Would a delay in production and fielding the M-1 tank reduce your capabilities to defend NATO Europe against Soviet aggression?

General **Rogers**. A delay in production and fielding of the M-1 tank would unquestionably reduce our capability to defend NATO Europe against Soviet aggression. The Army decision to field the M-1 was made after extensive testing. This testing encompassed both developmental and operational testing, as well as comparative testing against the M-60 tank. The M-1 is currently the best tank on the battlefield, and product improvement programs will continue. The M-1 incorporates major improvements in: crew protection, speed, battlefield agility, lethality, and fire control reliability. These improvements provide for greater survivability which allows us to defend more effectively for a longer period of time. To delay this capability, while the forces opposite NATO continue to be modernized, is not in our best interests and would adversely impact on our ability to defend NATO Europe.

INF MODERNIZATION

Senator **Levin**. General Rogers, what is the latest possible date in each nation by which time that nation has to decide whether to accept the GLCMs/P-II's so that preparations can be made to support planned-for deployment dates?

General **Rogers**. [Deleted.]

ARMS CONTROL

Senator **Levin**. General Rogers, our allies always have the INF talks as being "within the context" of overall negotiations on strategic arms control efforts.

Are prospects for our INF deployments reduced if we do not begin talks within the near future on strategic arms control?

General **Rogers**. The first part of your question is correct. The allies have discussed INF arms control in the strategic arms control framework. They have expressed their conviction that a positive outcome of these negotiations would contribute to greater East-West stability and progress in other East-West arms control negotiations.

But it does not naturally follow that prospects for our INF deployments will be reduced if we do not begin strategic arms control talks in the near future. Implementation of the modernization program is continuing and should be altered only by a fair and effective arms control agreement.

Senator **Levin**. General Rogers, some groups in the U.S. are proposing that the U.S. and Soviet governments begin negotiations on a freeze on the testing, production and deployment of all nuclear weapons. This proposal seems to be gaining support throughout the country.

What are the implications for such a freeze on the present arms control talks with the Soviets, on the INF modernization program and on NATO's defense capabilities and policies?

General **Rogers**. In the absence of a credible conventional capability, NATO must rely on its intermediate range nuclear forces for deterrence. To unilaterally restrict our only credible deterrent for this level of Soviet threat, in light of the massive Soviet SS20 program, is folly.

THE MILITARY BALANCE

Senator **Levin**. General Rogers, now that we and the Soviets have engaged in the 1981 version of "chart wars" as both nations have issued slick propaganda booklets trying to show the other is the military "heavy" in the world, wouldn't you agree that it is time we focused on more meaningful comparisons, such as those which include our allies and Soviet allies around the world in the overall military balance?

Shortly after the Pentagon issued "Soviet Military Power, I asked Secretary Weinberger to produce such a balance. In an October 21, 1981, letter to me Deputy Secretary Carlucci wrote:

"We recognize that, in addition, it could be useful to supply European publics with the type of balance information which you describe. The U.S. is working with our NATO allies on a study of the NATO-Warsaw Pact military which we expect will be released before the end of the year."

Such a document was not issued by the end of the year, and when I asked Mr. Carlucci when it would be issued, he said that it was a NATO responsibility and that NATO, not DOD, was working on it. When will such a document be issued?

General **Rogers**. NATO is preparing the publication of such a Force Comparison Paper, but it is still under review at NATO HQ. The originally scheduled publication date was as indicated by Deputy Secretary Carlucci.

As with any publication endorsed by the Alliance, complete unanimity is essential prior to publication. Furthermore, for appropriate impact, simultaneous publication in all nations will require approved translations into each language and simultaneous release.

Every effort is being expended by the Alliance to obtain maximum impact by an early publication of the Force Comparison Paper. The latest estimate from the NATO International staff is that the document should appear in all NATO nations prior to the May 82 ministerials.

Senator **Warner**. General, we will adjourn this session and reconvene in open.

[Whereupon, at 11:25 a.m., the subcommittee recessed in executive session and went into open session.]

OPEN SESSION

The subcommittee reconvened in open session at 11:30 a.m., Senator John W. Warner, chairman, presiding.

Present: Senators Warner and Nunn.

Senator **Warner**. Mr. Perle, we welcome you and your colleagues to this continuation of the Strategic Subcommittee hearings.

The policy that I have set is that we try and do as much as possible in open session thereby better informing the American public of the necessity for the enhanced fiscal program outlined by the President and the Secretary of Defense, and I appreciate that each of you are prepared to speak to some extent in open session and then we will go into closed.

Secretary Perle, you have submitted a very good statement here this morning and I would like to commend you at the outset on the content of this statement.

Senator Nunn, do you have any opening comments before we proceed to hear the Secretary?

Senator **Nunn**. No, Mr. Chairman. I am just delighted to have the witnesses here, and I am particularly delighted to have Richard Perle back with us. He kept us straight around here for quite a while on most occasions. I know he has been up here and testified before, but I haven't had a chance to be here. So we are delighted to have him, General Burke, and the other witnesses.

Senator **Warner**. Mr. Secretary, you may proceed as you wish and then I will let you designate your colleagues here in which order they should address the issues. Then we will proceed into executive session.

STATEMENT OF RICHARD PERLE, ASSISTANT SECRETARY OF DEFENSE [INTERNATIONAL SECURITY POLICY]

Mr. **Perle**. Thank you very much, Mr. Chairman.

I am especially pleased to appear before the subcommittee, a subcommittee of my favorite Senate committee, to discuss the administration's theater and nuclear weapons program, the role of theater nuclear weapons in our deterrent strategy and the strategy of our allies, and the negotiations on theater nuclear weapons arms control now underway in Geneva.

Let me say at the outset that there is no generally recognized definition of the term "theater" in this context. Most often it is used to define that class of weapons that are, by contrast with central strategic systems, of shorter range. The term "strategic" itself lacks precision, and it is partly for this reason that the arbitrary distinction between weapons that are strategic and weapons that are tactical has often obscured the fact that our deterrent posture is based on the capability to deliver weapons of differing range against a wide variety of targets in the Soviet Union and on the territory of its allies.

THEATER WEAPONS

For purposes of this discussion I will use the term "theater weapons" to describe those nuclear weapons other than ICBM's, SLBM's and long-range bombers.

These weapons consume only a small fraction of the defense budget, something on the order of 1 percent. yet they constitute a crucial link in the spectrum of deterrence, occupying an essential middle between conventional forces at one end and central strategic weapons at the other.

Not very long ago the United States possessed a significant superiority in theater nuclear weapons. For many years we maintained some 7,000 such weapons in Europe alone, not because we ever envisioned the actual use of anything like such a large number, but because we could not anticipate where one of these weapons might have to be used and were thus compelled to distribute them over a large and varied area.

In recent years the number of theater nuclear weapons in Europe has been reduced on the NATO side with little publicity and even less of a reciprocal response from the Soviet Union. We removed some 1,000 theater weapons from Europe in 1980.

CAUSE FOR ARMS CONTROL

It was hoped at the time that this unilateral gesture by the United States would further the cause of arms control. It did not. Indeed, the number and variety of theater nuclear weapons deployed by the Soviet Union has been steadily increasing over the last decade. For example, in the last decade the Soviets have increased their land-based nuclear missile systems by about one-third.

Today the Soviet Union deploys an awesome array of theater nuclear weapons. Indeed, with respect to the most formidable theater nuclear weapons, longer range missiles with high accuracy and great mobility, the Soviets now possess the ultimate superiority. For they alone possess ballistic missiles that can strike deep into NATO territory from Soviet bases. We for our part do not now have a single theater nuclear missile that is capable of striking targets in the Soviet Union.

MASSIVE SOVIET BUILDUP

Since 1977, when the deployment of these missiles began, the Soviets have deployed some 280 SS-20's, each with three independently targeted warheads and each capable of striking targets at a range on the order of 5,000 kilometers. Moreover, the SS-20 has a refire capability which, given the mobility and survivability of the SS-20 launcher, constitutes a formidable current, and still more formidable future, capability.

With just one refire missile per SS-20 launcher, and while the Soviets have deployed at least one, there could be more than one per launcher, the SS-20's would be capable of delivering some 1,700 warheads anywhere on the Continent of Europe and well into the seas beyond in a matter of minutes and with great accuracy. In addition, the Soviets have retained some 300 older SS-4 and SS-5 missiles. Like the SS-20, these weapons can strike anywhere in Europe.

On the Western side the growth of theater nuclear weapons represented an effort to even up the conventional disadvantage from which NATO has lone suffered. In the logic that led to their deployment, nuclear weapons in the theater could compensate for the massive Soviet superiority of tanks and artillery arrayed against NATO, particularly on the central front.

We believed that it was essential to Western security that we retain control over possible escalation in the event that a Soviet attack in Europe appeared likely to produce a conventional military victory. Consistent with this element of the NATO strategy of flexible response, the United States has never been willing to renounce the first use of nuclear weapons in the theater, although we have paid heavily in propaganda terms for our refusal to do so.

Obviously no such logic attaches to the massive buildup of theater nuclear weapons by the Soviet Union. In possession of superior conventional forces, the Soviets can hardly justify their massive theater nuclear forces as a necessary offset to Western conventional military power. Nor can the Soviets argue that their buildup of theater nuclear forces is intended to supplement inferior strategic forces, for here, too, the Soviets have been marching relentlessly toward superiority with seeming indifference to the economic costs and despite a decade of arms control negotiations.

SOVIETS DESIRE MILITARY SUPERIORITY

One is driven, I fear, to a menacing conclusion. The Soviets desire military superiority at all levels—conventional, strategic, and theater nuclear. They wish to control escalation by maintaining a clear margin at all points along the spectrum of potential conflict, a spectrum that we define in terms of deterrence and the Soviets in terms of offensive capability.

It is one of the consequences of the American preoccupation with strategic arms limitation talks that the growth and development of Soviet theater nuclear forces has proceeded almost without notice. It has burst upon us not because it happened overnight, but because we had our gaze fixed elsewhere. It was on SALT and the strategic balance that our attention was riveted.

There is a certain irony in this, for the development and deployment of the newest and most capable Soviet theater nuclear system, the SS-20, is almost certainly a product of the interim agreement on offensive arms signed in 1972.

Prior to 1972 and for some time thereafter the Soviets maintained a number of SS-11 ICBM's targeted on NATO Europe. When the interim agreement was signed the Soviets moved quickly to exploit one of its many loopholes. They substituted SS-20's for SS-11's and converted silos for the latter into silos for a new ICBM, the SS-19, whose existence they had sought to keep secret during the negotiations.

They were thus able to increase significantly the offensive threat to the United States while deploying weapons threatening Europe outside the constraints of the SALT I agreement.

I hope and trust that we have learned an important lesson and will apply it vigorously in the current negotiations on intermediate range nuclear forces. The lesson simply put is this. If we limit weapons over part of the range spectrum we invite the Soviets to deploy new weapons just below the range limit with a result that is tantamount to circumvention of the agreement. And in our preparations for the negotiations currently underway in Geneva we were mindful of this lesson and configured our proposals to take account of it.

U.S. AND ALLIED NUCLEAR DOCTRINE

I should like to say a few words about our doctrine and that of our allies for the deployment of theater nuclear weapons before going on to describe our current program for the modernization of these weapons. In doing so I wish to emphasize that our theater forces, like our central strategic forces, are aimed fundamentally at deterring aggression. For despite the effort of the Kremlin's propaganda machine to convince anxious allies that we are planning to wage a nuclear war in Europe with the sort of callous disregard for human life that one would expect from the makers of "yellow rain," deterrence is our doctrine.

Should the North Atlantic alliance find itself confronted with Soviet aggression, it is our strategy to take such action as may be necessary to cause the enemy to cease his attack and withdraw. We would hope to be able to do so through the skillful application of conventional power. But we believe it essential to retain the capability to use nuclear weapons if necessary to deter their use by the Soviets and to forge a vital link to the ultimate guarantor of NATO security, the strategic nuclear forces of the United States.

I think the earlier discussion with General Rogers has underlined why we feel it is not adequate to rely simply on conventional capability.

Through the early 1970's NATO had high confidence that this posture would deter Soviet aggression. Despite Soviet conventional superiority on the ground in Central Europe, the alliance had the means to extract a heavy price for any conventional aggression, and it retained the option of escalating the conflict to the nuclear level where the West possessed demonstrable superiority in strategic nuclear capabilities.

LOST SUPERIORITY IN STRATEGIC FORCES

But as we moved into the mid-to-late 1970's we began to lose this superiority in strategic forces. This profound change in the strategic environment meant that is was no longer clear that the posture NATO had developed and maintained for over two decades would suffice to deter the Soviet Union. In particular it was feared that the Soviets could come to believe, however mistakenly, that they could threaten to use nuclear weapons based in the Soviet Union against our European allies without risking nuclear retaliation against the Soviet homeland.

These fears substantiated the developments in the Soviet force posture to which I referred earlier, developments that demonstrated that they sought to weaken the link between U.S. strategic forces and European defense. Not only did the Soviets continue their decade-long buildup of conventional and strategic nuclear forces, they introduced in the 1970's the MIRV'd SS–20 missile, a missile whose range and mobility was designed to exploit the new strategic relationship between the United States and the U.S.S.R. and to expand significantly their capability to launch strikes against our allies from the sanctuary of their own territory. This was only part of larger theater force buildup which included new shorter range missiles and aircraft.

The alliance recognized that these developments threatened to undermine the central principle upon which the alliance was formed, that an attack on one member is an attack on all, and to decouple the U.S. strategic deterrent from the defense of Europe.

BASING PERSHING II BALLISTIC MISSILE LAUNCHERS IN EUROPE

The absence of any significant Western capability to hold targets in the Soviet Union at risk from nuclear missiles based in Western Europe left a gap in the spectrum of NATO's deterrent capability. After 2 years of intensive analysis and consultation, NATO ministers agreed in December 1979 to deploy 108 Pershing II ballistic missile launchers and 464 ground-launched cruise missiles in several basing countries.

Our planned force of Pershing II and GLCM's is designed to provide sufficient capability to carry our militarily significant strikes on Soviet territory, but not to be so large as to convey the impression that NATO is fielding an independent strategic force.

As an integral part of their decision NATO Defense Ministers also agreed to pursue United States/Soviet arms control negotiations involving these long-range systems. NATO was careful to stipulate that the arms control dimension of the 1979 decision would be pursued in parallel with modernization.

Although the United States made the first offer to engage in theater arms control negotiations soon after the 1979 NATO decision, and in fact repeated this offer several times, the Soviets did not respond favorably until several attempts to derail the NATO modernization decision had failed. Only when it became apparent that NATO's resolve was firm did the Soviets agree in late 1980 to preliminary exchanges.

These negotiations, the INF negotiations as we now call them, have now begun. President Reagan has made a bold proposal, a balanced and eminently fair offer, that we will scrap the deployment of the Pershing II and ground-launched cruise missiles if the Soviets will dismantle their SS-4, SS-5, and SS-20 missiles. We have also proposed constraints on short range missile systems without which the Soviets could circumvent the ban on longer range systems much as they did following the 1972 interim agreement.

While we negotiate, the preparations for deployment of the ground-launched cruise missile and Pershing II have proceeded on schedule. Our arms control initiatives will carry little weight with the Soviets if we and our allies fail in our resolve to press ahead with those deployment plans. These deployments are to begin at the end of 1983. If our arms control initiative is successful prior to that, we will cancel our plans. If agreement has not been reached by the end of 1983, then we will begin deploying these missiles. We will eliminate them later if the Soviets later agree to our proposal.

INCENTIVE TO BARGAIN SERIOUSLY

If we falter now in our plans for deployment, we will remove the Soviet incentive to bargain seriously. By continuing with our deployment schedule, we not only provide the necessary incentive for the Soviets to bargain, but we are also providing the weapons necessary for deterrence should the negotiations fail.

Mr. Chairman, the NATO decision of December 1979 is now being implemented with a high degree of solidarity among the allies who made it in 1979. The program is on schedule, and this is so despite the news reports of demonstrations that come daily from Europe indicating some public reservations about the program.

PROGRAMS TO ENHANCE SURVIVABILITY, SECURITY AND EFFECTIVENESS

Let me turn now briefly to the programs we have underway designed to increase the effectiveness, the survivability and the security and safety of our nuclear forces.

NATO will replace by the mid-1980's most of its current dual-capable aircraft with dual-capable F-16 and Tornado fighter bombers. We also will continue to upgrade our stockpile of air-delivered weapons by deploying new bombs that have improved military charactristics and enhanced safety and security features.

We are undertaking several programs to upgrade our short-range nuclear capability. Included among these are production of new 8-inch artillery rounds and additional Lance warheads, both incorporating an enhanced radiation feature. The new artillery round has greater range than deficiencies.

These new enhanced radiation warheads are being stockpiled on U.S. territory. Any decision to deploy ER warheads would be taken only after close consultation with any country on whose territory they would be based, and then only with the explicit approval of the President.

Land-based defensive forces include the Nike Hercules air defense systems and atomic demolition munitions. We are continuing to examine modernized alternatives to these systems.

To modernize the nuclear capability of our submarines and surface ships we are deploying weapons that will enable us to counter the enemy air threat more effectively and to attack enemy submarines from longer ranges.

While all of these weapons will help defend our naval forces, they will also strengthen deterrence. These weapons, together with our sea-based nuclear forces for land attack, and our land-based nuclear forces, will discourage the Soviets from believing that they could limit a nuclear war to forces at sea.

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We are addressing total long-range command, control, communications and intelligence requirements for nuclear weapons custody, targeting and control. We expect to include some key initiatives identified in these studies in future defense budgets.

The safety, security and survivability of our nuclear forces are key elements of our modernization program. We are continuing to make our nuclear forces more survivable in combat. We are taking steps to improve the protection of our nuclear weapons from seizure by enemy forces or terrorists. We are working closely with the Department of Energy to make our nuclear systems safer and more secure.

To insure that our theater nuclear force posture supports our strategy of flexible response, we constantly review our programs. One of the major efforts in this regard is carried on in NATO's High Level Group. I have the privilege to chair that group which consists of senior officials from the Defense and Foreign Ministries of all of our allies, except France and Iceland.

It was the High Level Group that prepared the recommendation for modernization of the longer-range force producing the December 1979 decision. Recently the group completed and forwarded to Defense Ministers a comprehensive assessment of NATO's nuclear force requirements. The report pointed clearly to the need to continue to modernize NATO theater nuclear forces as agreed in December 1979 in the face of the growing Soviet theater nuclear threat. The group will soon undertake the task of examining specific force elements and recommending any necessary changes.

Mr. Chairman, the changes we are making and will make in the future to our theater nuclear force posture are designed to deter war and to be able to terminate any war that may begin on terms favorable to the free world.

We have counted in the past on the support of this committee to sustain these programs and I hope and trust that we will be able to do so again this year.

Thank you very much.

Senator WARNER. Thank you, Mr. Perle.

I think before we open to questions, if it is agreeable to you, Senator Nunn, that we will ask Mr. Perle to have his colleagues add what they wish during open session.

STATEMENT OF CAPT. WALTER J. COAKLEY, U.S. NAVY, ACTING DIRECTOR, STRATEGIC AND THEATER NUCLEAR WARFARE DIVISION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

Captain **Coakley**. Mr. Chairman, I am Capt. Walt Coakley, the Acting Director of the Navy Strategic and Theater Nuclear Warfare Division in the Office of the Chief of Naval Operations.

I have about 4 or 5 minutes of an unclassified statement I would like to offer at this time.

NATIONAL NUCLEAR POLICY

My Division is the Navy's focal point for translating national nuclear policy into Navy requirements and for assessing how well our current and future systems, plans and policies support national objectives.

I appreciate the opportunity to appear before this important subcommittee.

Senator **Warner**. Let me just ask you one organizational question. In the Army, General Fulwyler has the title of Director of Nuclear and Chemical. Who handles the chemical program in the Navy?

Captain **Coakley**. The chemical is handled by the Navy CBR Defense Advisory Group, which is chaired by the Deputy Chief of Naval Operations (Surface Warfare).

Senator **Warner**. So there is no parallel table of organization?

Captain **Coakley**. No, sir, I have no chemical responsibilities.

Senator **Warner**. Thank you.

Captain **Coakley**. Last year Rear Adm. Powell Carter, then the Director, testified before this subcommittee on the status of the Navy nuclear weapons programs. At that time the Navy's testimony on these important questions reflected guarded optimism that we would be able to overcome the benign neglect that our tactical nuclear systems had suffered since they were last modernized in the 1960's.

GROWTH OF SOVIET NUCLEAR THREAT

Other witnesses have testified eloquently as to the enormous and continuous growth of the Soviet nuclear threat to the United States. What may not be visible to some observers is that the Soviet nuclear threat to our naval forces has grown in proportion to the other components of the Soviet arsenal.

Of major importance to us in carrying out the Navy's mission is that the Soviet Navy's growth into a blue water force of major capability has been accompanied by the continuous strengthening of Soviet naval nuclear muscle.

Recognizing these ominous trends in 1980, the Chief of Naval Operations directed the revitalization of the Navy's tactical nuclear capabilities. Our plans to end were described in some detail last year before this subcommittee and your support for the Navy's plans was very welcome.

As you know, Mr. Chairman, the Navy's current nuclear surface-to-air missile was first deployed in the 1960's and was designed to meet the aircraft threat of that era. Accordingly, we are now developing an extended surface-to-air missile, the Standard missile 2, which will modernize our capabilities to meet the Soviet threat. The nuclear armed version of this missile should be ready for deployment in the mid-1980's and will greatly expand the battle space within which the fleet will fight.

SOVIET SUBMARINE THREAT

Our second major tactical nuclear concern is the Soviet submarine threat to control of the seas. Again, we have been reliant upon 1960's antisubmarine weapons and again the Soviet threat has not stood still. The growth of the Soviet submarine force and its greatly improved capabilities are well known to this subcommittee. Soviet submarines have grown faster, quieter and far more capable.

To deal with this threat, the Navy is developing a common ASW standoff weapon designed for deployment in both surface ships and submarines. The conventional and nuclear capabilities of this weapon are needed.

Senator **Warner**. Captain, let me interrupt you for a minute. I have glanced over your statement and I think it sets forth in a very general way the policy of your Department.

Senator Nunn has an engagement and I am anxious to afford him the opportunity to provide some questions to Secretary Perle. Therefore, we will put your statement in its entirety in the record, and at this time I will call on Senator Nunn.

[The prepared statement of Capt. Walter J. Coakley follows:]

Prepared Statement of Capt. Walter J. Coakley

Mr. Chairman, gentlemen. I am Captain Walt Coakley, the Acting Director of the Strategic and Theater Nuclear Warfare Division in the Office of the Chief of Naval Operations. This Division is the Navy focal point for translating national nuclear policy into Navy requirements and for assessing how well our current and future systems, plans, and policies support national objectives, I appreciate the opportunity to appear before this important subcommittee.

Last year, Rear Admiral Powell Carter, then the Director, of the Strategic and Theater Nuclear Warfare Division, testified before this subcommittee on the status of Navy nuclear weapons programs. At that time the Navy's testimony on these important questions reflected guarded optimism that we would be able to overcome the benign neglect that our tactical nuclear systems had suffered since they were last modernized in the 1960s.

Other witnesses have testified eloquently as to the enormous and continuing growth of the Soviet nuclear threat to the United States. What may not be visible to some observers is that the Soviet nuclear threat to our naval surface forces has grown in proportion to the other components of the Soviet arsenal. Of major importance to us in carrying out the Navy's mission is that the Soviet Navy's growth into a blue water force of major capability has been accompanied by the continuous strengthening of Soviet naval nuclear muscle.

Recognizing the ominous trends, in 1980 the Chief of Naval Operations directed the revitalization of the Navy's tactical nuclear capabilities. Our plans to that end were described in some detail last year before this subcommittee. Your support for the Navy's plans was very welcome, and this year we will ask for your continued support for our efforts to meet this Soviet threat.

As you know, Mr. Chairman, the Navy's current nuclear surface to air missile was first deployed in the 1960s, and was designed to meet the aircraft threat of that era. Accordingly, we are developing an extended range surface-to-air missile, the standard missile TWO which will modernize our capabilities to meet the Soviet threat. The nuclear armed version of this missile should be ready for deployment in the mid-1980s, and will greatly expand the battle space within which the fleet will fight.

Our second major tactical nuclear concern is the Soviet submarine threat to control of the seas. Again we have been reliant upon 1960s era antisubmarine weapons.

Again, the Soviet threat has not stood still. The growth of the Soviet submarine force, and its greatly improved capabilities, are well known to this subcommittee. Soviet submarines have grown faster, quieter and far more capable. To deal with this threat, the Navy is developing a common ASW standoff weapon designed for deployment in surface ships and submarines. The conventional and nuclear capabilities of this weapon are needed.

Of equal importance to the Navy is the ability to effectively distribute naval striking power throughout the fleet. To this end, we plan to deploy modernized and in some cases new naval nuclear capabilities in a variety of ships, from submarines to surface combatants, as well as in carriers. The sea-launched cruise missile will provide a major new capability to the fleet. With the deployment of the nuclear land attack version of this missile in 1984 aboard attack submarines we will begin the process of distributing our naval nuclear striking power. Deployments on surface ships will follow. With this plan we will also be providing additional survivable assets for the strategic reserve; as described in the President's October 2, 1981 plan.

In addition to modernizing our aging nuclear weaponry and deploying the sea-launched cruise missile, we are strongly emphasizing training and the development of tactics for conducting nuclear warfare on, over, under and from the seas. We are also emphasizing aircraft, ship and system survivability programs, examining vulnerabilities to nuclear effects, and developing concepts and techniques to reduce or at least minimize the effect of these phenomena on naval forces and systems. These less visible but vital progams are as important to the naval mission as weapons modernization.

In summary, Mr. Chairman, the Navy is working across the board to provide the Nation with an effective force capable of deterring or, if necessary, fighting and prevailing in a nuclear war at sea.

Senator NUNN. Thank you, Mr. Chairman.

I just have a couple of questions.

Mr. Secretary, on page 11 of your statement, the fourth paragraph down, the last sentence, you state, and I quote:

> These weapons, together with our sea-based nuclear forces for land attack and our land-based nuclear forces, will discourage the Soviets from believing that they could limit a nuclear war to forces at sea.

I have three or four questions here.

NUCLEAR WAR AT SEA?

I guess the first one would be do we have information that would indicate to us that the Soviets believe that there could be a nuclear war at sea that would not spread?

Mr. PERLE. Senator Nunn, I am not certain whether we have information based on Soviet doctrine in writing, but if one looks at some of their force posture, I think it is clear that from the land and indeed at sea the Soviets retain a significant capability to attack ships at sea, and they may, as a consequence, be misled into believing that so long as civilian casualties are not involved in such attacks, as they presumably would not be, they could in fact limit a war to attacks on forces at sea. Given the vital importance we attach to maintaining the sea lines of communication, that would be a very dangerous development.

Senator NUNN. Well, what I am trying to determine is, is this a new theory that we have not stated that indeed may be something that is within their capability and therefore in their mind, or is it continuation of old policy? Is this a deviation or is this a continuation of what we have had for a long time?

Mr. PERLE. I think we have always had the concern that deterrence depends so heavily on the assumption that the very large-scale destruction involved would act as a deterrent. We have to be concerned about a situation in which military operations could be conducted without that large-scale destruction on land. So I don't think there is anything particularly new about it.

Senator NUNN. I just wonder if this is part of a so-called war-widening type strategy as a deterrence. We have heard a lot about this in the posture statement and in other open testimony and articles and so forth. Is this a part of the strategy that this administration has, that if we are attacked with nuclear weapons at sea that we have the option and part of our policy would be to provide the capability of then moving it to land?

Mr. PERLE. Yes, I think that fairly describes the desire on our part not to permit the Soviets to determine the scope of the battle to give whatever advantages would be inherent in their having the freedom to choose where the battle would be fought.

Senator NUNN. But now in your statement it is pretty clear that you think we have a distinct disadvantage when it comes to theater nuclear weapons on land. Your statement is very emphatic about that. I am inclined to agree with you. I am not arguing with the proposition that we really have a real disadvantage when it comes to theater nuclear weapons. Is that not your position?

Mr. PERLE. Yes, I believe that is correct. That is a serious change from the recent past.

STRATEGIC NUCLEAR WEAPONS DISADVANTAGE

Senator NUNN. Aren't you also of the opinion that we have a disadvantage when it comes to strategic nuclear weapons vis-a-vis the Soviet Union today?

Mr. PERLE. There I think the balance has been deteriorating and I hope we will be eventually correcting that.

Senator NUNN. Well, how do you credibly threaten escalation from the sea to the land with nuclear weapons when we have a distinct disadvantage with both theater and with strategic weapons on land? How does that kind of threatened escalation carry with it any credibility, that if they hit us at sea, where in my view we still have more of an advantage or less of a disadvantage, depending on your perspective, than other areas, but if they hit us at sea we are going to escalate into theater weapons where we have a distinct disadvantage or to land strategic weapons where we also have a problem?

Mr. PERLE. If I can give you one hypothetical scenario that may help answer the question. If we were in a position where we were losing significant naval forces at sea to Soviet attack with nuclear weapons, there would be some significant advantage in having those forces at sea capable of striking the land bases from which those attacks might be launched.

This is a scenario for less than an all-out nuclear war, and it is certainly true that those ground-based naval support facilities could be attacked by weapons other than sea-based weapons. But having some capability from the sea to attack targets of that kind strengthens deterrence overall.

SOVIET LAND-BASED NUCLEAR ATTACK

Senator NUNN. Are you assuming that a Soviet nuclear attack against our naval fleet would then be land-based rather than sea-based?

Mr. PERLE. It could be both, but the Backfire poses a formidable threat to the fleet, and indeed in many of the areas in which the fleet operates the Soviets have the advantage of significant land-based air assets, for example. But they also, of course, have capabilities at sea. I think it generally is going to be in our interests to have forces at sea capable of striking land targets of that kind.

Senator NUNN. Could we really hit land-based Backfire bases from the sea without launching the strategic nuclear forces from the sea? Do we have a capability of launching from the sea an attack against Backfire bases, or many of them, without in fact firing these submarine-launched ballistic missiles?

Mr. PERLE. Well, as you know, we have in the program now the TLAM-N which would have that capability.

Senator NUNN. Which weapon is that?

Mr. PERLE. The Tomahawk with a ground attack nuclear warhead.

Senator NUNN. Is the range of that classified? If it is, we will defer that to closed.

Mr. PERLE. Yes, sir. We will be happy to provide that.

[The information follows:]

The range of the TLAM-N is [deleted] kilometers.

Mr. PERLE. It is not essential that one be able to attack any particular target from any particular platform, but there is something to be said for finding ways in which the scope of a nuclear exchange could be limited and limited in some logical way that would enable us to try to bring a nuclear war to a close with a minimum amount of destruction.

Senator NUNN. Well, I certainly share that goal. I will have to think through the whole implications of this. If this is a continuation of an existing policy we have had for a long time, and I have certainly never heard anyone in any administration say that if our aircraft carriers were attacked with nuclear weapons we would try to confine the whole threat to sea. I mean, I don't understand that to have been the policy in the past.

So I am really trying to determine how much of this is new and how much of it is an emphasis that this administration is pushing for deterrent purposes.

Mr. PERLE. My colleagues may wish to elaborate on this, but there has been a concern, Senator, for many years that attacks on forces at sea, because they do not involve the levels of destruction, in particular civilian damage, that would be entailed in a nuclear attack against land, such attacks could put us in the difficult position of finding a response that is sufficiently serious and yet contained so as to minimize the prospects of escalation getting out of control.

Senator NUNN. Well, I share that. I just wonder though if a strategy which says if you strike with nuclear weapons at sea that we won't confine our attacks against your sea-based forces but we will go after your land forces, is that really containing escalation? It seems to me that you are escalating onto the land, you are taking the first step to escalate onto the land and you are escalating into the very area where the Soviets, according to your own views, and I share those, have very distinct advantages.

I don't understand the credibility of that as a deterrence. You know, if we said, for instance, that we had the advantage on land, and that when we started striking on land that advantage would then inure to our benefit, I can understand that as a deterrent. Or that if we still had the strategic nuclear advantage, and if you move in this direction we are going to use our strategic weapons, I understand that as a deterrence. That was the John Foster Dulles' view. But where we say we are going to escalate into the very area where we concede you have a very distinct advantage, it is kind of like the old Marks' cartoon with a pistol up against his head saying if you take one step closer I am going to pull the trigger. I don't understand it as a deterrent.

Mr. PERLE. Well, the problem you get into is that we have long worried about a situation in which ships at sea were to come under attack, either a large number of them at once or ships simply began disappearing, and there were indications that nuclear weapons had been used to destroy them in a situation where we lack the strategic superiority we once had, and for that matter superiority in the theater.

It is not obvious how one deters that sort of thing from happening or brings it to a halt if it begins to happen. Our naval forces, and in particular our surface combatants are just as vulnerable to nuclear attack as are theirs.

Senator NUNN. I have always felt that probably the last thing the Soviets would do is to begin a battle with the United States at sea with nuclear weapons. I put that almost down at the last of the escalatory things that they would begin. I mean, I think that would be almost a follow-on of anything that started somewhere else.

I think they would naturally start where they had the more distinct advantage, and that would be the conventional forces and perhaps escalate or either preempt with theater nucs, and maybe that is still our view. It seems that we are making this a pretty high priority kind of contingency and maybe it is a much more likely scenario than I had previously envisioned, but I have got to redo my thinking.

Mr. PERLE. I don't think we are making it high priority. The sentence in my statement that you chose to talk about may seem that we accord more importance to it than we do.

Senator NUNN. I never have seen it before. That is the reason. Anyway, thank you, Mr. Chairman.

THREAT OF BACKFIRE BOMBERS

Mr. MULLEN. Senator, I think the Navy may wish to talk to that. Certainly one of the largest threats to the Navy and the largest concern is the ability of the Soviets to attack our forces with their Backfire bombers. Since we are in open session I can't say much more, but they are cruise missile equipped.

Senator **Nunn**. I wish the Navy was so concerned about that that they would start talking to the Air Force about maximizing our land-based air to go after the Soviet Navy because it seems to me that both of those things go together.

I take it Secretary Weinberger is trying to move the system in that direction from some of the things he has said, but I find it over and over again puzzling that the Navy can conjure up such a tremendous threat from the Backfire but in most theaters of the world does not ever want to count on U.S. land-based air. I am not saying that they wouldn't, but I mean from a planning document, and I think the Air Force can make a major contribution in going against the Soviet fleet.

So I would hope that the Navy would reciprocate that kind of threat. I believe Secretary Weinberger may be moving in that direction. If he is, I applaud him.

Mr. **Mullen**. I defer to Kelly, but I think the Air Force is moving in that direction.

Senator **Nunn**. How about the Navy? [Laughter.]

The Air Force has been trying to move in that direction for a long time. I just don't want to get in a situation where we skip over the Air Force and have the Army defending the Navy at sea. [Laughter.]

Senator **Warner**. I think at this point the Chair will resume control of the hearing. [Laughter.]

Senator **Nunn**. Thank you, Mr. Chairman.

Senator **Warner**. Well, I wish I could say thank you, Mr. Nunn. [Laughter.]

Senator **Nunn**. You can.

Senator **Warner**. Secretary Perle, if you would designate your other colleagues who have comments in open, and then I have one or two questions to direct to you. Then we will go into executive session.

STATEMENT OF LT. GEN. KELLY BURKE, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, USAF

General **Burke**. Just a few words from the Air Force, Mr. Chairman.

The major contribution the Air Force makes today to theater nuclear forces is in our fighter attack aircraft which are in the jargon called dual-capable airplanes that can do both the nuclear and nonnuclear missions. Today that consists of F-111's and F-4's. As we bring the F-16's onboard, and we are doing that at the rate of 120 per year just now, they will move into that role and do an even better job than the F-4's.

GROUND-LAUNCHED CRUISE MISSILE

Our major new step forward, of course, is the ground-launched cruise missile for which we will have the ultimate responsibility. It has been a very fast-paced program with more concurrency than normal because of the anxiety to get it in the field as quickly as possible. We have had some technical problems and cost problems associated with it, but we are still adhering to our December 1983 initial operational capability.

I think with continued strong efforts on the part of all of us we will make that. We plan to add 464 of those ground-launched cruise missiles, or GLCM's which are of course derivatives of the General Dynamics submarine-launched cruise missiles, in fairly short order.

It does a couple of very useful things. It adds a long-range, highly accurate system to our forces. It begins to pose a threat at ranges comparable, although a little less, than the SS–20, and it lets us free up the dual-capable aircraft which I think are unduly tied down to that fairly narrow role now and let's think about using them more in the nonnuclear roles which is where we actually want to use them.

So we are going to bring that along just as quickly as we can and try our best to keep it on schedule. That is the Air Force theater nuclear picture.

Senator WARNER. General, as you may have heard by now, in my swing through the country on this subject a week ago I expressed deep concern about the obsolescence of some of our nuclear weapons. Some of them of course don't get into the TNF area, but you know what I am talking about.

General BURKE. Indeed.

Senator WARNER. At some point in time, probably in executive session, I want to bear down on this and get the Department of the Air Force's views on what should be retired now and, in addition, in the light of our limited facilities in the United States to meet the workload we project with respect to the new weapons coming along, we can only go back and modify for safety purposes a portion of the existing inventory. Whether or not we could take, for example, those weapons which are used for strip alert and so forth, say 20 percent of them can be modified with the safety devices as opposed to the whole inventory.

Have you heard about this discussion?

General BURKE. No, sir, but I am very interested in it. Yet another factor is the availability of the materials to do all that.

Senator WARNER. The availabilitly of the materials.

General BURKE. Yes.

Senator WARNER. Be prepared at some point in time to discuss that with me.

General BURKE. I would be happy to.

Senator WARNER. Mr. Mullen, we are delighted to have you this morning.

Mr. MULLEN. I do not have a prepared statement. So I will defer to my colleague.

Senator WARNER. Fine. Thank you.

General?

STATEMENT OF MAJ. GEN. NILES J. FULWYLER, DIRECTOR OF NUCLEAR AND CHEMICAL, OFFICE OF DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS, USA

General FULWYLER. I have a prepared statement which is classified which I would like to submit for the record, but I can make a few remarks now in open session, if I may, Mr. Chairman.

Senator WARNER. Yes, certainly.

General **Fulwyler**. Well, as Mr. Perle indicated, deterrence is certainly our doctrine and our Army systems are very much a part of that, but that kind of gets to the heart of part of the problem that we have.

MEANINGFUL DETERRENT IMPORTANT

It is my personal opinion that a very important part of deterrence is the will and the resolve to use whatever you have to gain that deterrence. But all the will and resolve in the world are not going to do you any good unless you have a credible capability to demonstrate that will. That means we must have the systems and we must have the necessary warheads to go into those systems to really create and have a meaningful deterrent.

Now the Army in fulfilling its land warfare responsibility certainly must continue to make a contribution to nuclear deterrence as we have done for 20-some years. But we are reaching the point, as Mr. Perle indicated in his statement, that it is questionable, in my judgment, whether indeed they are contributing to deterrence today for the very reason that many of them are obsolescent. They are not functioning as designed and more importantly, they represent a technology that now is at least 20 years old.

I feel that for the Army to shoulder its fair burden in deterrence, we must modernize our systems. Our efforts are focused on the following systems. We are currently modernizing the Pershing missile. We are fielding a new 8-inch projectile which represents the state of the art today. We must do the same with our 155 millimeter howitzer round; however, we have had a great deal of trouble in the past gaining support for this system. I feel it is very important that we proceed with the 155 as well as the 8-inch.

I believe that the funds that we have requested and the ones that are in the budget will fulfill what we feel has to be done to support the Army systems.

I realize this is a theater nuclear forces hearing, but I would like to be sure that everyone understands that this is but one equation that we face on that battlefield today and I think it is wise for us always to remember that environment and the realities of that environment today. That is, it is not just a question of nuclear war or no nuclear war. It is going to be a question of conventional war, nuclear war and chemical war.

I think it is very important that we remember that that environment on that battlefield today is going to be far different than any one we have ever fought on before and that the chemical equation is going to play a very important part in this as well as nuclear. Indeed, the nuclear capability is tied very closely with chemical.

I can say more about that in closed session, Mr. Chairman, but I do feel it is very important that we understand and are realistic about the environment of that battlefield today.

Senator **Warner**. General, I thank you, and I have enjoyed our professional relationship over the year and we have got a major challenge before us this coming year on the issue of chemical weapons. I don't know quite how this will come out, but in you we have a skilled professional. I visited part of your command in Utah, as you know, and I was very much impressed with what they are doing out there and I know exactly what you are talking about.

General **Fulwyler**. Thank you.

ZERO OPTION PLAN

Senator **Warner**. Mr. Secretary, if that concludes all observations in open, I will just ask you one question and then we will proceed to closed session. In my travels as well as in testimony here in the last week or so very responsible witnesses have critized this zero option plan.

While you covered it somewhat in you prepared statement today, I think we had better tighten it up a little bit in the record, particularly what concerns you might have in the absence of the GLCM and the Pershing II and their Soviet counterparts, the SS-4's, SS-5's, and SS-20's, that the Soviet Union would enjoy at least as favorable a TNF advantage perhaps with their SS-21's and SS-22's. You know the subject. Tighten that up a little bit for us.

Mr. **Perle**. Thank you, Mr. Chairman. I am glad to do that. I don't know what sort of criticism you have encountered. I can understand why the Soviet Union would critize the zero option and indeed it has.

Senator **Warner**. I would prefer not to name them, but these are individuals who have spent a lifetime in issues of national defense and they are persons I respect. Their opening statement is they are surprised the Soviets didn't grab that option.

Mr. **Perle**. Well, I rather thought you might be talking about criticism from a defense perspective, and let me say a few words about that.

ARMS CONTROL AGREEMENT

I don't think there is any question that the President has offered an arms control agreement that contains some significant benefits for the Soviet Union, and it is probably for that reason that we are hopeful that we will succeed eventually in persuading them that the zero option is in their interest, just as we believe that on balance it is in ours.

The thing that it would accomplish from the Soviet point of view that ought to provide an incentive for them to take it seriously is that NATO will be giving up a very real capability, that is the capability to strike targets in the Soviet Union from allied territory with long-range missiles.

We would still retain some limited capability to attack targets in the Soviet Union from other forces, but we would be giving up that capability with respect to missiles where it is perhaps most effective. So they clearly have something to gain in that respect.

For our part, we would accomplish an important purpose on the Western side, and that is the elimination of highly accurate, short-time-of-flight ballistic missiles that threaten the very basis upon which we have enjoyed some stability in Europe in recent decades.

In a matter of half a dozen minutes virtually every high value target in the NATO Alliance can be targeted and attacked with an SS-20 warhead. This leaves even our existing theater nuclear forces highly vulnerable to Soviet attack.

So, we have been compelled in order to deal with that vulnerability to explore new deployments like the ground-launched cruise missiles and Pershing II's. So in effect we are proposing a bargain in which they remove the threat and we remove the response to the threat.

Now it will leave a gap. There is no question about that. We will not be able in the aftermath of the zero option, should that be approved in treaty form, to attack with missiles from Western European territory and strike targets in the Soviet homeland and I know there is concern about that.

I can only say to mitigate that concern that the benefits on the other side are significant benefits. They would leave our other theater nuclear forces far more survivable than they are under circumstances of the SS–20 threat and we will retain other means of attacking targets in the Soviet homeland.

Senator WARNER. We thank you, Mr. Secretary.

Now we will go into executive session as soon as the clerk informs the Chairman that the room is cleared.

[Whereupon, at 12:22 p.m., the subcommittee recessed in open session and proceeded into closed session.]

EXECUTIVE SESSION

The subcommittee reconvened in executive session at 12:25 p.m.

Present: Senator Warner.

Senator WARNER. Mr. Perle, we will be guided by your desires to supplement the record in classified session and each of your colleagues. We will follow the same format as before.

What additional information do you wish to supply?

POLITICAL SITUATION IN EUROPE

Mr. PERLE. I don't have a prepared statement for this classified portion of the hearing, Mr. Chairman, but let me say a word or two about the political situation in Europe with respect to what has become the most visible and publicly discussed element of our theater nuclear force posture and that is the modernization and deployment plans for Europe.

Despite what we read in the press and despite the almost daily political events that seem to bear on the resolve of the alliance to proceed with the December 1979 decision, on the whole we are quite satisfied that significant progress is being made [deleted]. But on the whole I think we are doing rather better.

Hardly a day passes without some local manifestation of concern about the deployment of nuclear weapons in Europe, [deleted].

We conduct almost continuous consultations with the allies on this program [deleted]. So far we have seen no indication that the alliance will fail to carry through on that decision. So on the whole we are reasonably encouraged. [Deleted].

Senator WARNER. Why don't we start with General Fulwyler this time.

General FULWYLER. Mr. Chairman, I have a classified statement that covers most of my area which I will just submit for the record to save time.

[The prepared statement of Major General Fulwyler follows:]

PREPARED STATEMENT OF MAJ. GEN. NILES J. FULWYLER

Mr. Chairman, members of the subcommittee, I would like to take a few minutes of the subcommittee's time this morning to explain the Army's TNF modernization goals.

The Army must be prepared to fight on an integrated battlefield. By that, I mean that the conventional high explosive weapons which have been predominant on every battlefield in recent centuries are only one threat that we face on today's battleground.

The factor that makes this battlefield different is, of course, the presence of weapons of mass destruction. This presence has a fundamental impact on strategy and doctrine—and certainly on equipment.

These weapons of mass destruction, specifically nuclear weapons, can decisively change combat power ratios, and thus alter the course of battle dramatically. They can be used to withstand an overwhelming conventional attack; to rupture tough defenses; and to respond to an adversary's use of the same type weapons. Deterrence against use of such weapons is best guaranteed by ensuring that any potential adversary perceives that we have both the will and capability to use highly effective nuclear systems ourselves.

As you well know, all the "will" in the world will not do you any good unless you have the "capability" to demonstrate that "will". That is the heart of the problem for the Army. The Army must deploy a modernized TNF which will help maintain a credible deterrent posture by providing an effective warfighting capability. This is particularly important in view of the rapidly growing imbalance created by recent Soviet TNF improvements.

The Army currently has no systems that have a long range capability—that is, a range of 1000 km or longer. Our medium range systems are limited to the Pershing IA and the Lance.

The Pershing was initially deployed in 1963. It has a range of [deleted]. Three U.S. battalions and two GE wings (the equivalent of two U.S. battalions) are deployed to NATO in support of theater-wide missions.

Even though the Lance is discussed as a medium range system, many consider it short range since it will not reach more than 100 km within enemy territory. The Lance, initially deployed in 1970, is the newest Army system. It has a [deleted]. The United States has 8 Lance battalions; 6 of which are deployed in Europe. NATO countries that have the Lance system include Belgium, The Netherlands, United Kingdom, Germany, and Italy.

The Honest John rocket and 8-inch and 155mm nuclear projectiles make up the short range systems. [Deleted] forces continue to have the Honest John.

The 8-inch nuclear projectile is the oldest nuclear system in the inventory. There are two versions of the 8-inch warhead; one that has a [deleted] and one that can be assembled to provide [deleted]. The United States provides 8-inch nuclear support to [deleted].

The 155mm nuclear projectile is the final member of our short range stockpile. Nuclear support with this system is provided to [deleted].

The Nike Hercules is primarily an air defense system. The Patriot, a non-nuclear system, will replace the Nike-Hercules in U.S. forces. The United States provides Nike Hercules support to [deleted].

The medium atomic demolition munition (MADM) and the special atomic demolition munition (SADM) provide a means for delay and disrupting enemy movement. United States ADM teams are earmarked to provide ADM support in Allied corps' in Central Europe and in [deleted].

Even though the Army's current nuclear systems that I have just discussed do provide a nuclear capability to our ground forces, there are serious deficiencies within each category. They employ outdated technology and do not incorporate the latest safety and security devices which the state-of-the-art will allow. Higher yield options of our medium range system restrict targeting flexibility due to collateral damage constraints in the zone where the Warsaw Pact second echelon forces will congregate. The Pershing provides target coverage to only [deleted] and its relatively [deleted] requires [deleted] for adequate target coverage.

Our short range systems are aging; they have inadequate ranges and inaccurate fuzes. The 8-inch requires time-consuming field assembly and special gunnery techniques; the 155 has a [deleted]. The command and control mechanisms of both of these systems are only marginally adequate.

The Army's programs are designed to correct all of these deficiencies.

The deployment of Pershing II in December 1983 will provide a long-range capability for NATO that will put at risk targets in the Soviet Union. The [deleted] range, coupled with a [deleted] accuracy will permit [deleted] to achieve the desired target damage while reducing collateral damage. The PII will replace the PIA currently deployed with U.S. forces on a one-for-one basis. The Germans will most probably opt to modernize their PIA force with a PII variant that will have all the PII characteristics but only a [deleted] range. The modernized W70-3 enhanced radiation warhead for Lance is currently in production. This will complete the total warhead build for this weapon and provide needed targeting flexibility.

Preliminary investigations are ongoing to define a corps support weapon system—the CSWS—to replace Lance and to provide a greater capability to engage second echelon forces. A nuclear warhead is being considered as an option for this system.

The modernization initiatives on the short-range category are designed to increase range, improve responsiveness, enhance military effectiveness, and provide the latest technological features for safety, security, and command and control. Congress has supported the new 8-inch projectile which entered into production last year.

The successful development and deployment of a modernized 155mm nuclear projectile represents a continuing struggle for us. Since 1969, the Army has been consistent in stating a requirement for a modernized 155 AFAP; however, we are no closer to deploying a new one now than we were in 1973 when the Joint Committee on Atomic Energy cancelled the last development program. In 1977, Congress approved the initial R. & D. funds to develop the new system. Development was proceeding on schedule until 1979 when the R. & D. funding was reduced to $10 million, just enough to keep the program active. In December 1980, OSD again deferred the program by zeroing out fiscal year 1982 R. & D. funds and redistributing them in the out years. The Army was successful in gaining DOD approval (after the change in administration) to restore sufficient R. & D. funds in fiscal year 1982 to achieve the desired IOC of [deleted]. Sufficient funds were not appropriated to the Department of Energy in their fiscal year 1982 budget, however, to maintain the program on schedule so we are now looking at another 11-month delay. That translates to an IOC of [deleted]—17 years since the requirement was first stated! This program is absolutely necessary to permit retention of a survivable, operationally flexible and militarily effective short range capability. I solicit your continued support.

The Army has sufficient funds in this year's budget to support the aforementioned modernization programs as they are currently scheduled. I would like to remind this subcommittee, however, that the Army cannot unilaterally bring these efforts to fruition. The DOE weapons complex shoulders a major portion of the fiscal requirements for our programs. Your support of their efforts remains critical to the eventual success of our programs.

DEPARTMENT OF ENERGY

General **Fulwyler**. I would like to emphasize two points and both of them deal with DOE [Department of Energy].

We talk about tactical nuclear weapons or strategic nuclear weapons. I feel that we oftentimes forget to address another part of this problem, and that is the availability of special nuclear material. These nuclear weapons systems are no good unless we have the material to make the nuclear warheads. [Deleted.]

All I would say is that I think this is a national problem and that it is simply mandatory, in my opinion, that we give serious consideration to the [deleted].

I would remind you that the best estimates that I have [deleted].

Senator **Warner**. As you may know, I went to Savannah River and looked that whole situation over with Senator Thurmond and I also watched it from the perspective of my assignment as a member of the Senate Energy Committee and I am fully aware of that problem, General, and I am glad that you brought it up and we put it in this record because it definitely bears on this issue.

General **Fulwyler**. Well, it bears on more than just the Army, but I happen to be close to it and I am very concerned about it.

Senator **Warner**. Absolutely.

Mr. Mullen do you have anything further you want to say?

Mr. **Mullen**. No, I have no other comments. Thank you.

Senator **Warner**. General Burke?

GLCM

General **Burke**. Let me just say a few words about the technical progress of the GLCM. You might recall just about this time last year we talked about the ALCM. There were some difficulties we were having and you had some very deep concerns over that, as did I, although I expressed some cautious optimism.

Let me just talk a little bit about the ALCM first. I recognize it is not for TNF, but it is the precursor of this new family of cruise missiles.

We have had a very good year. At the time that I talked with you a year ago we had had a higher number of failures than anybody would have been happy with. We have had a lot of success in the past year. In fact, we have had 10 consecutive successful ALCM flights which is very encouraging.

But even more encouraging I point out to you that last year when we were talking about this that the real proof of the pudding would come when we began the flight tests of the ALCM off the operationally modified B-52's. The initial tests were done off of sort of a jury-rig platform. We now have those airplanes and we are a perfect six for six in those tests and that I think is very encouraging.

A lot of that is transferable to the GLCM. The engine is the same and that was one of the great technological challenges, to build that little engine to do all that. The other great challenge was the guidance system and they are identical. So I think that does well for GLCM.

Turning specifically to the GLCM though we have had some technical problems with it primarily associated with the software. I think that was the inability of the selected contractor to come to grips with it and we are running behind on that. We are at a stage though that we have a workable system but not workable as nicely as we want it to and expect it to. So we need another upgrade of that software. We may well make the initial deployment with a less than optimum software configuration but it will still work. It is a slower and more tedious thing.

We have just had our first GLCM all-up test flight. Of course, it builds heavily on the SLCM program, but the first all-up GLCM round from a shell was last week and it was quite successful.

So on balance I think it is an encouraging picture.

Senator **Warner**. Captain?

ADVANTAGE AT SEA

Captain **Coakley**. Mr. Chairman, I would like to just comment briefly on the advantage at sea and the question that Senator Nunn brought up. Clearly in a conventional conflict we think that we have the advantage at sea. [Deleted.]

With the Soviet stand-off submarine-launched cruise missiles that can attack fleet units and with the land-based air long-range aviation with the AS-4 missile, we are concerned about our ability to get leakers on that if they are nuclear weapons. The programs we are looking at are to try to restore that advantage both nuclear and conventional at sea.

I would also like to second the analysis of General Fulwyler's. Our comments on special nuclear material are just exactly what he has reported.

SAFETY OF HANDLING NUCLEAR WEAPONS

Senator WARNER. I want to address a general observation to each of you. I will be looking at the question of the safety of handling nuclear weapons, all categories, and what we should do in terms of modernization and retiring some of these systems.

For example, gentlemen, I visited Tooele, Utah. I presume your stockpiles in Europe are suffering some of the same decomposition problems.

General FULWYLER. You are talking about the chemical stockpiles, sir?

Senator WARNER. Yes.

General FULWYLER. [Deleted.]

Senator WARNER. I really don't even want to put this in the record even though it is an executive session. I feel it is such a sensitive thing and I would hope that those of you who want to consult with me privately would do so and I will make the determination of what should or shouldn't go in the record.

If we had an incident needless to say either here in the United States or abroad it would just retard the work that Secretary Perle and the others are doing on the diplomatic fronts maybe to a point where it is irretrievable. I don't know.

Please feel free to seek any private counsel you wish with me as I work in this area because we have got to address it.

Do you have anything further, Mr. Secretary?

Mr. PERLE. On the question of chemical weapons, Senator, I am---

Senator WARNER. We will be back with you on March 15, as I understand you will be here at that time and we will have a full hearing on that subject.

SOVIETS PREPARED TO FIGHT A CHEMICAL WAR

Mr. PERLE. We are especially grateful that you have taken the interest that you have in that. The public as a whole doesn't appreciate the extent to which chemicals figure in Soviet doctrine and planning. The media has been doing rather a good job lately of developing points that the government didn't do a particularly good job of developing.

ABC News has gone after this with some vigor and they have produced some extremely balanced reporting. We think it is terribly important to get out to the public the significant degree to which the Soviets are prepared to fight a chemical war.

Senator WARNER. I am prepared to join in that. I have tried to stay away from the media until I finish my hearings for fear that I would be less than objective in the course of the hearings, but I will be out publicly on this in the not too distant future.

I learned about this subject at the knee of my father who was in the trenches of World War I as a doctor and actually took care of those who were injured through chemical and other means and those are lasting impressions.

Another little bit of interesting history on it, and I am still trying to track it down with my favorite colleague over here and the General, but I was told that the Soviets suffered more casualties in World War I from chemical weapons than any other nation.

Those are little points that the public will take in, you know, and begin to think, and that is the motivation behind the Soviet intensified program.

I think we can gain public and perhaps international support on this issue if we begin to frame it in more understandable terms and appear less beligerant.

The bottomline is that all of us have children I suppose in one stage or another, but my son is prepared to go into the Armed Forces and I sure don't want him in Europe staring at some threat which he has absolutely no ability to defend himself against.

General Rogers really pounded the desk here 2 hours ago and he said the bottomline is 325,000 young Americans, male and female, who are almost defenseless on this whole issue of chemical warfare.

Gentlemen, I have some questions from the members of the committee which I will submit for the hearing record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

SS-20S DEPLOYED VERSUS THE PRC

Senator **WARNER**. Mr. Perle, how do you regard the threat to Europe posed by the many, highly mobile Soviet weapons systems deployed against the People's Republic of China?

Do you regard them as being altogether unavailable for European contingencies, partially available or designed and based in conjunction with a swing-strategy that makes them a significant threat to Europe in any planning contingency?

Mr. **PERLE**. Given its range and mobility, an SS-20 located anywhere in the USSR presents a threat to NATO Europe.

Senator **WARNER**. Mr. Perle, the Reagan administration has been given a great deal of attention to the issue of stemming the hemorrhage of high technology from the West and especially the United States to the East. How high a priority do you give this problem and how directly does the military application of some of this diverted technology affect our strategic and theater nuclear force balance?

Have you been able to quantify the added difficulty we encounter in meeting our national security requirements as a result of the added mobility afforded Soviet forces thanks to Kama River Engines, the improved accuracy of the USSR's ballistic missiles as a result of the U.S. ball bearing technology, et cetera?

Mr. **PERLE**. You have raised several important questions which I will answer in turn. I am the responsible Defense Department official for strategic technology transfer policy. This function is given the highest priority by the Defense Department and by my staff. As you know, the Secretary of Defense has the statutory responsibility to identify the strategic importance of any item requiring a validated export license for national security reasons. My office provides the final determination in such cases, especially concerning exports to proscribed destinations such as the Soviet Union and its allies.

Some of the Western technology acquired by Soviet military and military-related industries (e.g., metallurgy, shipbuilding, advanced microelectronics and others) comes from illegal sources in the West. Useful technology has also been acquired legally because of a lack of controls or inadequate controls (a situation we are working to remedy with our allies). A further useful source of longer-term R. & D. information is derived from open scientific and engineering literature, and other forms of information exchanges such as seminars and "student" exchange programs. It is difficult to track and measure the total affect of this short-term and long term "hemorrhage" of military useful technology and information on the strategic and theater nuclear force balance. Most of the Western technology is "sovietized" over several years and integrated into existing weapons technologies after the Soviets have mastered its applications. Such technologies (microelectronic devices is a good example) have been found in Soviet military equipment enhancing its performance. Such improvements in performance can be critical at the margin. The Soviet Union produces large quantities of generally good to very high-technology equipment. This Western edge in technology is being eroded by improvements to Soviet weapons derived from the eastward flow of Western technology and information. To keep our critical technology edge requires investing more dollars in R. & D. and engineering. These Defense costs to the West, which draw resources from their social investments, are undercut and made even more costly by the continued Soviet access to Western technology and scientific and engineering information.

We have a study effort under way with our NATO allies which we believe will help measure the impact of West-East technology transfers on the NATO missions. [Deleted.]

REPERCUSSIONS FROM POLAND

Senator **Warner**. Mr. Perle, how do you view the state of the Alliance today in light of the mixed responses provided to date by the Western Europeans to developments in Poland?

What import does the role of the Polish Army in suppressing the Solidarity movement have for our assessment of Warsaw Pact forces' reliability in support of Soviet activities, especially in the time of war?

Mr. **Perle**. One of the strengths of the Alliance is the recognition that its members will have differing views on many subjects, including some that, as in the case of Poland, seem to us to be of security concern. It is not meant to be a monolith on which we impose a uniformity of views, as the Soviets do on the Warsaw Pact. At the same time as the Allies differ on the response to Polish developments, however, they are working closely together on military programs to strengthen their mutual defenses.

In the martial law situation, Polish soldiers proved reliable in obeying orders they believed came from the Polish leadership, as we would expect them to do in a wartime situation in which they perceived Poland to be threatened. The events did not, however, provide any indication of how they would respond to Soviet direction in a case when no threat to Poland was visible.

PATIENT ARMS CONTROL NEGOTIATIONS

Senator **Warner**. Mr. Perle, in a recent session with three noted observers of Soviet-American relations, the subcommittee heard testimony that indicated that success in arms control negotiations often depended on their being conducted in a patient and unpublicized manner, to the greatest extent possible, by seasoned technical experts, and in an atmosphere free of artificial, politically-imposed deadlines. Do you agree with that assessment and to what degree do you anticipate the Reagan Administration will be able to pursue its initiatives in the INF and start negotiations in this manner?

Mr. **Perle**. Success in arms control negotiations undoubtedly requires patience, experienced negotiators and a degree of respect for the confidentiality of the negotiations, but it also requires mutual interest in genuine reductions and a political desire to achieve meaningful verifiable and mutually equitable outcomes. While we recognize that there is considerable public interest here and abroad in both the INF and START negotiations and do not believe that the current Soviet propaganda efforts to play on this interest are useful, it is our expectation that both the INF and START negotiations will be conducted in a business like and serious manner.

GLCM

Senator **Warner**. Mr. Mullen, the subcommittee has been greatly concerned about the cost growth that has been experienced in the gound-launched cruise missile program. What is being done about this problem to ensure that costs do not continue to escalate out of control? Are we on track for meeting the development milestones and deployment dates for the GLCM?

Mr. **Mullen**. The GLCM flight test program has just started with two successful flights completed on 25 February 1982 and 25 March 1982. The program is currently on schedule and, barring any unforeseen delays, will begin deployment in Europe in December 1983.

The GLCM system development and deployment are being pursued on an expedited basis to counter the rapidly expanding Soviet threat and meet the December 1979 NATO decision. As a result there is a high degree of concurrency and with the test program just getting underway, there is considerable schedule and cost growth risk. We, in the Office of Under Secretary of Defense for Research and Engineering, are concerned about this risk and recently conducted a major review of the program and directed bi-weekly status reports be submitted to this office. The Secretary of the Air Force is also directly involved in the program issues and receives bi-weekly reports on the status of contract definitizations in addition to a major program review every three months.

The importance of this system to the operational effectiveness of our NATO forces as a counter to the growing Soviet threat makes the risks acceptable.

PERSHING II

Senator **WARNER**. Mr. Mullen, the GAO has been highly critical of the technical performance of and development program for the Pershing II missile. In view of the political and international repercussions that a failure of this system to meet its projected accuracy or IOC might have, would you address yourself to the status of the Pershing II at this time?

Mr. **MULLEN**. The Pershing II (PII) component qualification and ground tests have all been successful to date, and the first flight test is now scheduled for June 1982. The PII development is on schedule to meet the December 1983 IOC in Europe.

The GAO's primary concern with accuracy is the performance of the system's digital correlator using DMA products. The PII advanced development program demonstrated the feasibility of the radar correlator and its ability to meet the accuracy specifications. During extensive captive flight testing in engineering development, the correlator has also consistently demonstrated the capability to meet the accuracy specification using DMA generated scenes. The DMA data base [deleted]. However, DMA will produce, by the December 1983 IOC, [deleted] "hand-crafted" reference scenes for use against the SACEUR high priority preplanned targets and will provide annually [deleted] reference scenes as long as they are needed. In addition to the hand-crafted scenes for preplanned targets, DMA will also furnish [deleted].

NAVY'S VULNERABILITIES TO NUCLEAR WAR

Senator **WARNER**. Captain Coakley, in your submitted statement you make a highly important point: The Navy needs to understand and be better prepared to redress its vulnerabilities to nuclear attack.

What specific measures are being pursued to accomplish this goal?

Captain **COAKLEY**. The Navy has embarked in a multi-faceted program in an attempt to identify ship, aircraft and system vulnerabilities to nuclear effects and to develop methods and techniques which will allow these systems to be designed and hardened against these effects.

Specific examples include: (1) The Ship Survivability Program which identify and develop hardware modifications and prototypes that will increase conventional and nuclear weapon effects protection and survivability for surface ship combat systems. This program considers all effects of nuclear weapons, such as overpressure, thermal, electromagnetic pulse and radiation. (2) The Electromagnetic Pulse Radiation Environment Simulator for Ships (EMPRESS) Program focuses on the damaging effects of the electromagnetic pulse (EMP) generated by a exoatmospheric nuclear burst. EMP can cause both system upset and permanent damage in electronic systems. This program is designed to test, identify and verify EMP hardening effectiveness. (3) The Fleet Aircraft Assessment—Naval Test and Analysis for EMP Limitations (FAANTAEL) assesses by test and analysis EMP vulnerability of naval tactical aircraft and avionics.

The Navy is aware of its vulnerabilities to nuclear attack and is committed to develop highly survivable systems. We earnestly solicit the continued support of this subcommittee for these efforts.

THE THEATER NUCLEAR BALANCE

Senator **WARNER**. Mr. Perle, would you provide for the classified record a detailed comparison of Soviet/Warsaw Pact theater nuclear forces with those of the United States/NATO. Please indicate relative capabilities and quantities of such forces, their states of readiness and the degree to which individual systems are considered to be "forward-based systems" by the USSR and their Soviet counterparts.

Mr. **Perle**. (Two Interagency Intelligence Memoranda containing the data requested) "INF Support: Theater Nuclear Forces," NI IIM 10025, December 1981, SECRET NOFORN; and "SALT Support: European Theater Nuclear Forces," NI IIM 10002, March 1981, Secret Noforn FRD) are being provided to Senator Warner through the Director of Central Intelligence.)

REPLACEMENT OF OBSOLETE WEAPONS

Senator **Warner**. Mr. Perle, you mentioned in your statement the fact that we are continuing to examine modernized alternatives to the atomic demolition munitions and Nike Hercules air defense weapons. How long have we been considering this problem? What is the disposition of these weapons, their number and location? What alternatives are under consideration?

Mr. **Perle**. [Deleted.] We believe that replacing nuclear Nike Hercules with the new and more survivable Patriot air defense system is a prudent alternative to the currently deployed Nike Hercules system. [Deleted.]

STRATEGIC MODERNIZATION PROGRAM

Senator **Warner**. Mr. Perle, in your present responsibilities, you are charged with overseeing not only theater nuclear forces policy but also strategic nuclear forces policy. To what degree do you believe Congressional approval of the various elements of President Reagan's strategic force modernization program are essential to the conduct of American foreign policy in Europe and the accomplishment of important theater nuclear forces modernization efforts? Specifically, what importance should we assign to the development and interim deployment of the MX missile?

Mr. **Perle**. The strategic force modernization program is designed to restore a margin of safety to our deterrent capabilities in that area. As you know, we stress a continuum of deterrent forces, that is an ability to deter aggression at all levels. A gap in any portion of the deterrent spectrum is quite serious, because it calls into question the credibility of the entire deterrent. Deterrence is a cornerstone of our foreign and defense policy around the globe. To the degree that deterrence is undercut, out position around the world is weakened. Given this, failure to accomplish our strategic modernization plan would seriously weaken our overall deterrent posture, despite whatever gains we might make by modernizing successfully our INF in Europe.

With regard to the interim basing of the MX missile, we must deploy this powerful missile as soon as possible to begin to offset the current, highly destabilizing, Soviet monopoly in prompt hard target kill weapons. The missile will be ready for deployment in 1986; a truly survivable basing mode is not available at that time. The high priority need for offsetting the Soviet monopoly—and thereby strengthening deterrence—argues compellingly for deploying the missile as soon as it is ready to be deployed. This is why we are proceeding with interim basing—and it is why we assign interim basing particular importance.

THE EUROPEAN SITUATION

Senator **Warner**. Mr. Perle, how would you characterize the political state of affairs in Europe today, in the aftermath of the Polish crackdown, and following the tabling of President Reagan's zero option arms control proposal? Where do we stand on efforts to achieve greater European acceptance of and participation in American initiatives vis-a-vis the Eastern European bloc in areas such as the control of technology transfer, the extension of credits, energy policy and defense initiatives?

Mr. **Perle**. The current situation in Europe is complicated not only by the aftermath of the Polish crackdown and various arms control debates, but also by economic problems, resurgence of a pacifist, anti-nuclear movement and a political mood in some countries that questions the directions Western policy has taken in the post-war era. These factors make it difficult for many European governments to gain popular support for some of the actions we believe necessary to restrain Soviet access to Western technology and hard currency. We have been consulting closely with our Allies to provide them with information which may be helpful to them in developing support for a firmer posture toward the Soviets. President Reagan's zero-option proposal was highly successful in gaining European understanding and support for our arms control philosophy.

STATUS OF THE INF NEGOTIATIONS

Senator **Warner**. Mr. Perle, would you give the subcommittee a status report on the Intermediate Nuclear Force negotiations? What has the Soviet response been with regard to the draft text we have tabled? Is the administration serious about pursuing the zero option and are any steps being taken to alter or undercut that negotiating position unilaterally?

Mr. **Perle**. The first round of bilateral negotiations on Intermediate-Range Nuclear Forces (INF), which began November 30, 1981 in Geneva, ended March 16, 1982. Negotiations are scheduled to resume May 20. So far, the talks have been intense, serious and businesslike. The first round was productive in that the US and USSR set forth and explained their positions.

We were able to present fully the case for our draft treaty which we tabled February 2. The treaty embodies President Reagan's bold proposal, first announced in his November 18 speech, to cancel our deployment of Pershing II and ground-launched cruise missiles in return for the elimination of Soviet SS–20, SS–4 and SS–5 missiles worldwide.

The Soviets presented their proposal, which, as they have stated publicly, calls for mutual reductions to 600 "medium.range" systems by 1985 and 300 systems by 1990.

The Soviets have stated publicly that they find the U.S. proposal to be "patently unacceptable." There are obviously wide differences between the two sides; however, the negotiations are at an early stage.

The U.S. proposal for zero long-range land-based missiles on our side in return for zero on their side remains a sound and reasonable position. It is based on principles developed during extensive Alliance consultations: a step-by-step approach, a focus on the missiles of greatest concern to both sides, with equal rights and limits and global limitations. It is an eminently fair position which we will continue to pursue as negotiations continue.

SHORT-RANGE SYSTEMS

Senator **Warner**. Mr. Perle, how does the administration intend to proceed on the modernization of American short-range tactical nuclear systems in Europe. Do you believe such modernization is necessary?

How do you anticipate developments in the context of the INF negotiations may affect such modernization plans?

Mr. **Perle**. As I have stated in earlier comments, Soviet forces in all areas, conventional, theater nuclear and strategic have been expanded and modernized. In order to maintain the credibility of our deterrent forces, theater nuclear systems must be available in sufficient numbers and must possess the requisite operational capabilities to carry out their role in NATO's strategy of flexible response. Some badly needed modernization is already underway. Most of NATO's dual capable aircraft will be upgraded with F–16 and TORNADO by the mid-1980's, and our air-delivered weapons stockpile is being upgraded. Production of new artillery rounds and LANCE warheads, as I indicated earlier, are underway. However, much remains to be done to upgrade or replace our older delivery systems and the command, control and communication networks that will support them. The NPG High Level Group, of which I spoke earlier, will meet again in May of this year to continue investigation of our mid- and short-range theater nuclear modernization requirements.

Concerning the INF negotiations, I do not expect them to affect the modernization efforts I have just described. Although the Soviet Union has sought to include United States [deleted]. The INF negotiations do not encompass short-range systems. We do not intend to ignore modernization requirements in this area while INF negotiations are underway.

HIGH LEVEL GROUP RECOMMENDATIONS

Senator **Warner**. Mr. Perle, in your prepared statement you indicated that the HLG has recently completed a study of NATO's nuclear force requirements. Can you give the subcommittee a feel for the deficiencies and requirements that must be addressed most urgently that have come out of this study?

Mr. **Perle**. The study, NATO's Theater Nuclear Force Functional Requirements, was completed last Autumn by the NPG's High Level Group. It identified NATO's theater based nuclear force functional requirements in general terms and assessed the capability of NATO's current and planned nuclear forces to meet those requirements. From this general study, several requirements were identified as not being met in some ways and were, therefore, highlighted for further, more detailed investigation. Generally, the deficient areas found in our weapon systems related to questions of [deleted] and the operational capacity to [deleted]. These kinds of deficiencies limit our [deleted]. The other area in which deficiencies were identified, is in the [deleted] that support our theater nuclear forces.

TRIDENT II SALE TO UNITED KINGDOM

Senator **Warner**. Mr. Perle, what is the current status of negotiations between the United States government and that of the United Kingdom with regard to the modernization of the British strategic deterrent through the procurement of the Trident missile system? Has the Office of the Secretary of Defense been involved in consultation with the British as to the appropriateness of the choice of the weapon system versus a modernization program making use instead of sea-launched cruise missiles? Are steps now underway to attempt to reduce the cost of a Trident II buy to the United Kindom, making the U.S. Government pick up a greater percentage of the development costs associated with this program?

Mr. **Perle**. On March 11 the British Government informed Parliament that it had decided to modernize its deterrent force by acquiring the Trident II missile system rather than the Trident I (which it had agreed to purchase in July 1980). The British decision was taken in order to maintain commonality with the U.S. Navy. Although the performance of the Trident I is adequate for British purposes, there would be long-term logistic and cost penalties associated with the uniqueness of the system once the U.S. Navy made the transition to Trident II.

While the United Kingdom consulted with us on technical aspects of the system, the decision to buy Trident II was solely a British one. You will recall that the 1980 U.K. decision to modernize their deterrent by acquiring Trident I made note of the fact that the British Government had investigated, and specifically rejected on military and cost-effectiveness grounds, the choice of sea-launched cruise missiles over SLBMs.

The United Kingdom will pay a contribution towards the research and development costs of this system through a combination of cash and "offset" intitiatives—initiatives which the U.S. would otherwise have to take itself.

SLCMS AND INF

Senator **Warner**. Mr. Perle, I believe you were present when I asked General Rogers a question concerning the prospective role sea-launched cruise missiles with nuclear warheads might have in a theater context. Would you care to add to the discussion we had on that subject?

Specifically, the impact introduction of "strategic" SLCMs might have on the INF talks?

Mr. **Perle**. In the INF negotiations currently underway with the Soviet Union in Geneva, the US approach focuses on long-range, land-based missiles, the systems of greatest concern to both sides.

Thus, the Nuclear Tomahawk Land Attack Cruise Missile (TLAM/N) does not fall within the scope of the INF negotiations.

SS-20 DEPLOYMENTS

Senator **Warner**. Mr. Perle, in your last appearance before this committee, you noted that Soviet deployments of their potent SS-20 intermediate range ballistic missile were continuing a pace. There has been discussion in the West German press about a cessation of such deployments by the Soviets as a unilateral good-will gesture. Are the Soviets, in fact, reducing the rate of or halting the deployment of SS-20 missiles?

Mr. **Perle**. Soviet President Brezhnev, in a March 16 speech to the Soviet Trade Union Congress, announced a "unilateral moratorium" on future deployments of SS-20 missiles in the European part of the USSR.

Because the offer is limited to the European Soviet Union, it leaves the USSR free to continue its SS-20 buildup east of the Urals, well within range of Western Europe. As we have noted on many occasions, given its range and mobility, an SS-20 is a threat to NATO wherever located.

President Brezhnev clearly links his "unilateral" offer to the condition that Western preparations for the deployment of ground-launched cruise missiles (GLCM) and Pershing IIs, agreed upon in December 1979, do not proceed. This condition, plus the fact that the Soviets have already prepared sites for new SS-20's west as well as east of the Urals, demonstrate that this is a propaganda gesture, and that the Soviets do not really intend to stop their SS-20 buildup.

The Soviet SS-20 force already exceeds the dimensions of the expected threat when NATO took its decision of December 1979 to deploy U.S. GLCM and Pershing II missiles to Europe, and to seek through arms control to reduce planned levels of long range international nuclear force (INF) missiles on both sides. The Soviets now have 300 SS-20 missiles deployed, with 900 warheads. Brezhnev's freeze proposal is designed, like previous such statements over the past three years, to direct attention away from enormous growth of Soviet capabilities that has already taken place, and the enormous preponderance that the Soviet Union has thereby acquired. It is unfortunate that the Soviets did not choose to exercise real restraint before their SS-20 buildup began.

THE LRTNF PROGRAM STATUS

Senator **Warner**. Mr. Perle, where do the Dutch and Belgians stand at the moment on the issue of deciding whether or not they will accept GLCMs on their respective soils?

Do you hold out any hope that they will move in the direction of participation in the LRTNF plan in the near future?

What are the repercussions likely to be of a failure on the part of either of these nations to make such a move?

How do things look for continued German participation in light of the decision of Chancellor Schmidt's party to have a vote on the issue in the fall of 1982? How sensitive is that outcome going to be to signs of progress in the Geneva talks?

Mr. **Perle**. [Deleted].

EARTH PENETRATING PERSHING II

Senator **Warner**. Mr. Mullen, during a recent inspection tour of the Department of Energy weapons complex I had occasion to receive a briefing on the planned, but now shelved, earth penetrating warhead for the Pershing II missile.

To what degree do you believe in your own personal judgment that a requirement exists for such a weapon in the U.S. inventory, especially in light of continuing hardening of Warsaw Pact command and control facilities and rapid repair capabilities for airfields?

Mr. **Mullen**. There are currently no requirements for an earth penetrating warhead for the Pershing II missile. The warhead development however, has been completed to the extent that a weaponizable, tested system is available for future delivery systems. Thus, we will be able to use this "off the shelf" technology should it appear that there are targets which need such a warhead in order to provide adequate destruction with the associated low collateral damage.

Questions Submitted by Senator Sam Nunn

MIRV FOR PERSHING II

Senator **Nunn**. Mr. Perle, what advantages/disadvantages from a negotiating standpoint and arms control standpoint would providing multiple warheads for the Pershing II provide?

Mr. **Perle**. There are no plans at this time to provide the Pershing II missile with multiple warheads. Any consideration of providing the Pershing II missile with multiple warheads would be based fundamentally on assessments regarding requirements for such capabilities to maintain the security of the United States and its Allies. From negotiating and arms control standpoints, we do not know what impact multiple warheads on Pershing II would have on Soviet views. Such capability would not affect the basic position of the United States in the INF negotiations. As you know the United States has proposed to the Soviet Union that it will cancel the deployment of the Pershing II and GLCM systems in return for Soviet agreement to destroy its SS-20, SS-5 and SS-4 missile systems. We believe the United States proposal represents a sound and reasonable position—one which is strongly in the interests of both sides. Of course, multiple warheads are already a factor in the INF negotiations since the Soviet SS-20 missile is currently equipped with three independently targetable warheads.

NEUTRON WARHEAD

Senator **Nunn**. Mr. Perle, what is the status of the neutron warhead both in terms of Research, Development and Production and what is the status of current OSD policy on production and possible future developments?

Mr. **Perle**. The following table depicts the DOD costs of Research, Development and Production of Enhanced Radiation Weapons (ERW).

[In millions of dollars]

Warhead	Fiscal year—					
	1983	1984	1985	1986	1987	1988 +
W70-3 Lance	(1)	(1)	(1)	(1)	(1)	(1)
W79-1 8-in. howitzer:						
R&D	0	0	0	0	0	0
Procurement	14.4	11.7	2.8	0	0	0
Total	14.4	11.7	2.8	0	0	0

[1] No remaining DOD costs.

With respect to current DOD policy on production and possible future deployment of these weapons, in accordance with the President's August 6, 1981 decision, the U.S. is producting the 8-inch artillery and Lance Enhanced Radiation warheads in a fully assembled ER configuration. [Deleted.] Of course, a decision to deploy ER warheads would be taken only after close consultation with any country on whose territory they would be based, and then only with the explicit approval of the President.

ARMS CONTROL TALKS

Senator **Nunn**. Mr. Perle, what is the relationship between your office, State and ACDA in terms of DOD input into arms control policy development and negotiations? What is different from previous Administrations and do you consider this an improvement?

Mr. **Perle**. The policy of this Administration is that arms control will complement, not drive defense programs and that both will be integrated to serve our higher national security objectives. That is a significant change from the past Administration—and, I might add, an improvement.

The Office of the Assistant Secretary of Defense for International Security Policy (ISP) is the representative of the Secretary of Defense in all interagency deliberations to develop US arms control policy and represents the Secretary at ongoing bilateral and multilateral negotiations. Consistent with Administration policy, ISP, together with the Office of the Joint Chiefs of Staff, with whom we work closely, has a continuing and significant input into the formulation of US arms control policy and negotiations.

GLCM

Senator **Nunn**. General Burke, how well is the GLCM doing in its development and test phase? Will the system meet its operational capability in time for the deployment schedule?

General **Burke**. The GLCM development program is progressing satisfactorily as indicated by the start of the test phase in February 1982. A combined contractor/Air Force test team successfully launched a GLCM Tomahawk missile on 25 February at Dugway Proving Ground in Utah. It was the first launch using preproduction prototypes of the transporter erector launcher and launch control center.

Also, this was the first launch with the GLCM Common Weapon Control System software which has delayed the start of test on two occasions. The software remains the greatest threat to operational capability. However, the successful February launch boosts confidence that software development is proceeding in the proper direction and that the GLCM system will meet the December 1983 initial operational capability date.

Senator **Warner**. Thank you, gentlemen.

[Whereupon, at 12:40 p.m., the committee adjourned, subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

TUESDAY, MARCH 2, 1982

U.S. Senate,
Subcommittee on Strategic and
Theater Nuclear Forces,
Committee on Armed Services,
Washington, D.C.

LAND-BASED DETERRENT

The subcommittee met, in open session, pursuant to notice, at 1:51 p.m., in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Cohen, Hart, Exon, and Levin.

Staff present: Rhett B. Dawson, staff director and chief counsel; Francis J. Sullivan, minority staff director; Paul C. Besozzi, minority counsel; Frank J. Gaffney, George K. Johnson, Jr., Patrick L. Renehan, and James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; Robert Nichols, assistant to Senator Jackson; Arnold Punaro, assistant to Senator Nunn; Greg Pallas, assistant to Senator Exon; and Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator Warner. The subcommittee will resume its hearing today. This is the sixth hearing in a series that we have had thus far.

I have a prepared opening statement which I will not read in the interest of saving time, but I ask that it be placed into the record.

[The prepared statement by Senator John W. Warner, chairman, follows:]

Opening Statement by Senator John W. Warner

The Subcommittee is pleased to have as witnesses today individuals with direct responsibility for the development and ultimate deployment of systems of considerable importance to the future survivability of our strategic Triad. We are pleased to have before us today Dr. Alton Keel, Assistant Secretary of the Air Force for Research, Development and Logistics, Lieutenant General Kelly H. Burke, USAF, Deputy Chief of Staff for Research, Development and Acquisition and Brigadier General James P. McCarthy, USAF, Special Assistant for MX. These men, each of whom are well-known to members of the Committee, are involved in developing both the MX missile itself, and the interim basing scheme for the MX utilizing Minuteman silos selected by the President. They are also charged with exploring various options now under consideration for the long-term basing of this missile.

This Committee believes that one of the most promising of the long-term deployment schemes now under consideration is the deceptive, defended basing plan. In connection with the ballistic missile defense aspect of this plan, we have asked Deputy Assistant Secretary of the Army for Research and Development Amoretta Hoeber and Major General Grayson Tate, USA, Program Manager, Ballistic Missile Defense Program, to appear with their Air Force counterparts today. This joint appearance underscores the Committee's conviction that the highly important development activity now underway in the MX/BMD area, must benefit from a thoroughly integrated and fully coordinated effort by the parties concerned.

Senator WARNER. We welcome our former colleague, Dr. Keel.

Would you please start off, Dr. Keel.

STATEMENT OF ALTON G. KEEL, JR., ASSISTANT SECRETARY OF THE AIR FORCE FOR RESEARCH, DEVELOPMENT, AND LOGISTICS

Dr. KEEL. Thank you, Mr. Chairman.

With your permission, I will enter my prepared statement into the record and will simply make summary remarks.

I will be very brief.

Senator WARNER. That will be fine.

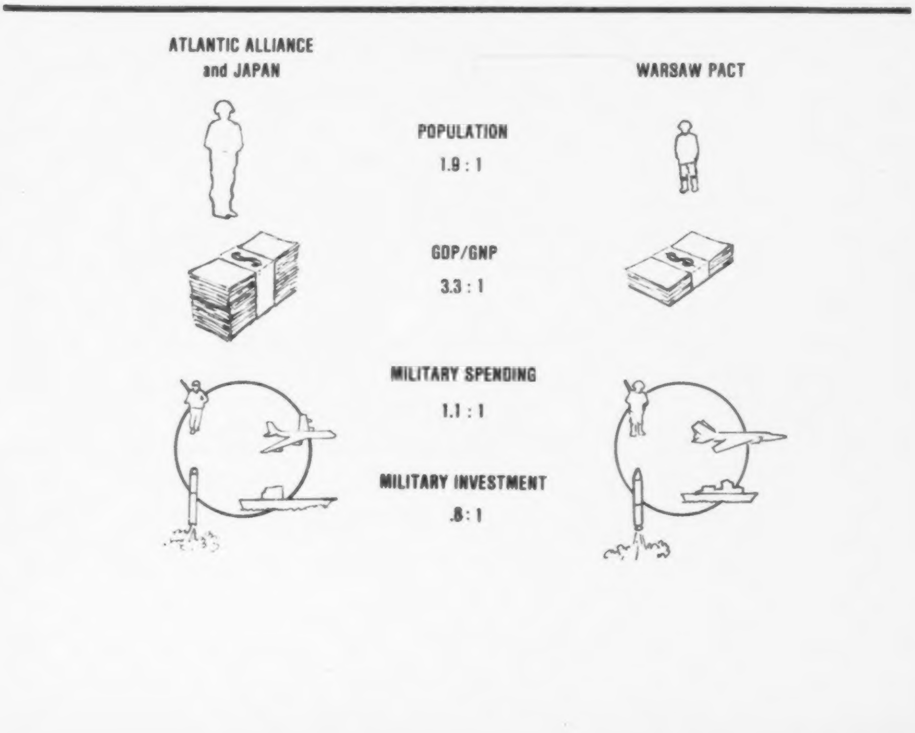
Dr. KEEL. I would like to start off, if I may, by talking about the threat.

Sometimes we lose sight of the fact that we only judge the adequacy of our defense request, its priority and its contents solely in the context of that threat.

So, if I may, I would like to use three simple charts and go over with you what I see as the challenge we face in the threat and particularly with the magnitude of the investment that the Soviet threat, in particular, have amassed over the last decade.

May I have the chart, please.

RESOURCE COMPARISON



Dr. **Keel**. To fully appreciate the extent of the Soviet-Warsaw Pact commitment, I think it is interesting to make this fairly simple comparison of resources.

If you compare the resources in terms of population, or people resources, of the Alliance and Japan with those of the Warsaw Pact, there is a roughly 2 to 1 advantage for the Alliance. If you compare the gross national product or gross domestic product of the Alliance with Japan to that of the Warsaw Pact, there is about over a 3 to 1 advantage.

Yet, in terms of just total defense effort, as measured in dollars, the Alliance is spending about the same as the Pact.

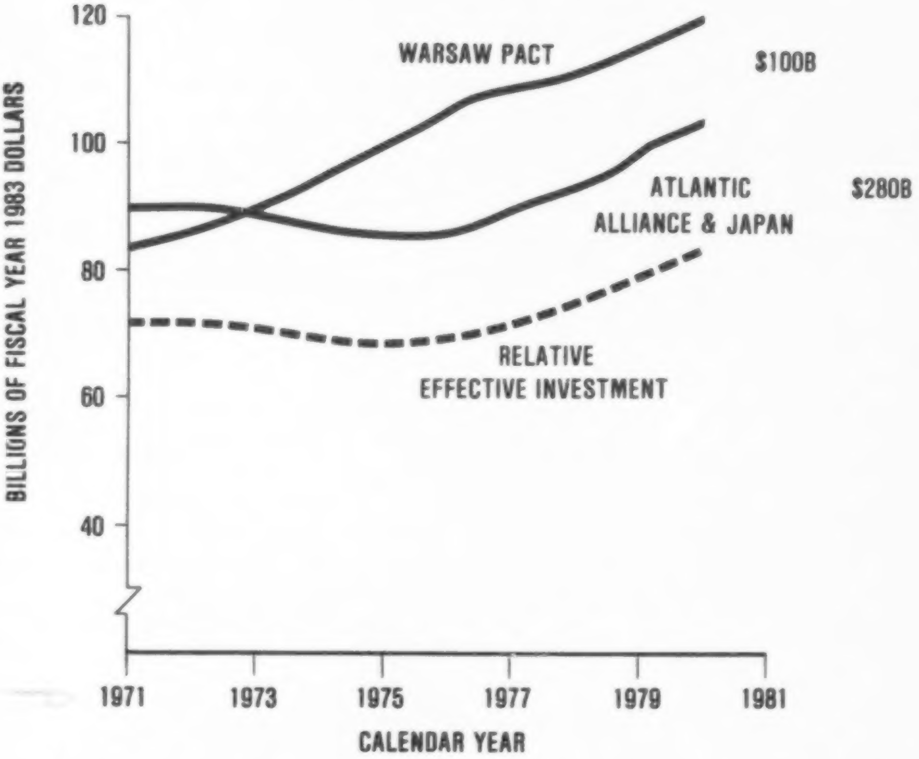
That does not tell you whether the level is enough, too high, too little, or just right. But in my view it does tell you one thing, and this is that on this basis, the magnitude of the effort of the Alliance is one-third that of the Warsaw Pact in terms of the gross national product.

You cannot judge the adequacy until you start looking at the components of that defense spending, how it is spent. If you do that, the pertinent comparison is one of military investment: How much is invested in procurement of weapon systems, R. & D. for weapons systems, military construction for weapons systems.

If you do that, you see the final entry on the chart, which shows that the Alliance is spending about 0.8 or 80 percent of what the Warsaw Pact is in so-called defense investment.

In fact, if you look at the trend for that, as shown on the next chart, you see that, in fact, the Warsaw Pact has been outinvesting the Alliance, if you will, in weapons systems since about 1972, with a cumulative investment over the Alliance since 1972 of about $100 billion.

MILITARY INVESTMENT COMPARISON



Dr. KEEL. Even this comparison, however, does not tell the whole story, because if you examine the contributions of the various members of the Alliance vice that of the Warsaw Pact, you will see that the Soviet Union, in fact, is contributing 90 to 95 percent of the Warsaw Pact investment.

So, as a consequence, you have essentially one-country control over the entire pact investment. That leads to actually more efficient allocation of the resources. There is, in fact, less duplication of forces, less duplication of capability, and more efficient procurement by buying greater numbers of fewer weapons systems.

Senator WARNER. Dr. Keel, in all fairness, doesn't manpower have a major role in that equation?

Dr. KEEL. No, sir, not in this. This is simply military investment.

Senator WARNER. No manpower?

Dr. KEEL. No manpower at all.

So, Mr. Chairman, if you take into account the efficiency factor and you look at the effective investment on the part of the Alliance, you can see that it is diminished somewhat, as shown by this overlay [indicating].

Senator WARNER. Dr. Keel, let me press that point again.

They have to spend far less on manpower costs and, therefore, they have more to put into investment.

Isn't there an indirect impact?

Dr. KEEL. Your point is well taken, in getting from total defense spending to military investment, Senator. If you remember the third comparison on the first chart, it showed that the Alliance defense spending was approximately equal, in fact, a little bit larger, to that of the pact. But then, when you take into consideration the variance in manpower costs and the costs of operating the support and simply then look at military investment, you will see that the Warsaw Pact is outinvesting us in weapons.

Senator WARNER. Quickly, just off the top of your head, a private in the U.S. Army earns how much per month in the NATO Alliance, and what is the corresponding figure for a Soviet private?

Dr. KEEL. I don't know the figures off the top of my head.

General BURKE. I don't know the figures, either, but I would say it is on the order of $500 on the one hand and $50 on the other.

Senator WARNER. That is about it, I believe.

Senator EXON. Let me follow up on that point, Mr. Chairman.

Doctor, I think this is what the Chairman is trying to get at. Isn't it true, if we were to put manpower in there along with military investment, in overall comparable strength that line would go up faster than it does just on military investment—would it not?

Dr. KEEL. No, sir.

If you look at a total defense spending on the part of the Alliance, as compared to total defense spending of the Warsaw pact, including military personnel and operating support, then today we are at about the same level of total defense spending. But, since our personnel and operations costs are more on the part of the Alliance, the investment that we put into weapons systems, procurement of the systems, R. & D. for systems, military construction and support systems, are less.

Senator EXON. I guess what I am trying to say, Doctor, is this.

If you have 2½ times the number of men and women under arms in the Soviet Union as compared with the number in the United States—and I don't know about the comparison with our allies, but isn't that about the right ratio, 2½ to 1?

General BURKE. Yes, sir.

Dr. KEEL. That's right.

Senator EXON. I would call people in standing forces an investment. I would think that the red line would go on up.

Dr. KEEL. Exactly. Your point is well taken.

If you actually look at numbers of people instead of dollars per people and incorporate that—

Senator EXON. We tend to get mesmerized on dollars. What we should be talking about is the overall potential threat.

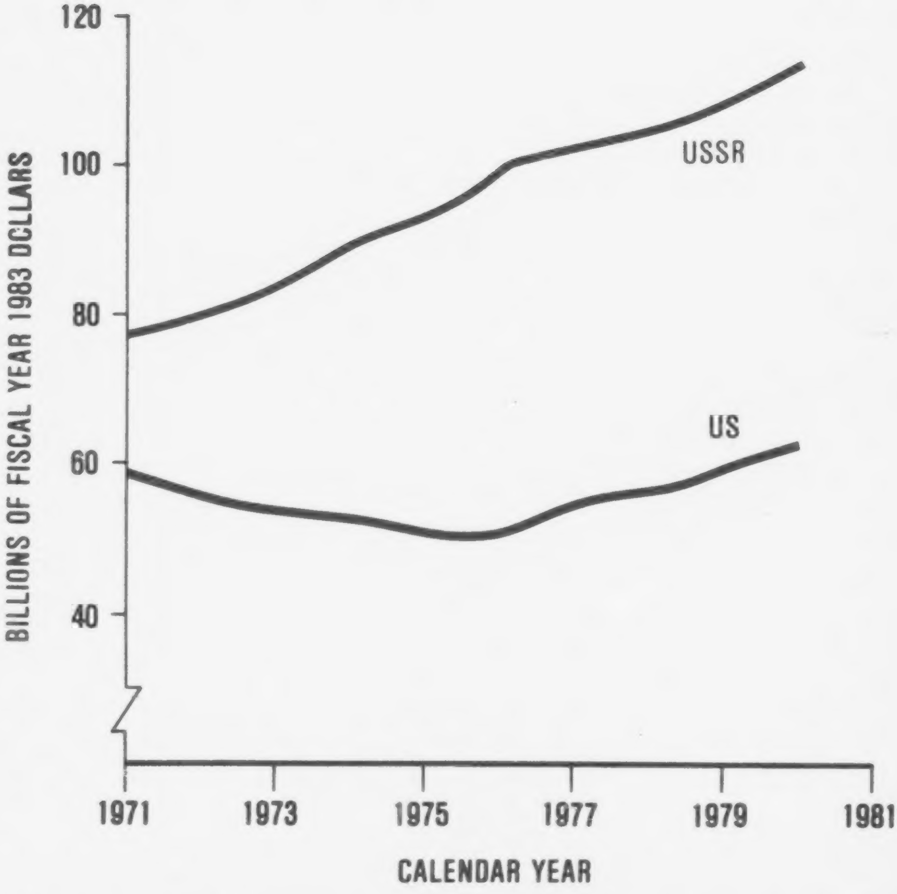
I think that many individuals under arms is a very critical part of the threat.

Dr. KEEL. You are absolutely correct.

Senator, if you then take into consideration the fact that with the one-country control, if you will, of Warsaw Pact resources, then they have more efficient use of those resources. Then, in effect, the effective investment of the Alliance is even less than that comparison would show. You can argue over how much less it would be.

It is of value, in fact, and it is imperative, in my mind, to finally and ultimately make a comparison directly between U.S. and Soviet investment. This is shown in the chart.

MILITARY INVESTMENT COMPARISON



Dr. KEEL. With that comparison, you see that today, in terms of military investment, the Soviets are outinvesting us in weapons systems about 2 to 1. In fact, they have been doing so, as illustrated by that chart, over the last 10 years.

They have been doing so, in fact, over the last 15 years. But over the last 10 years, they have invested a total of $400 billion more in constant 1983 dollars in weapons systems, including $30 billion more in procurement, $100 billion more in R. & D. and $70 billion more in military construction.

In strategic force procurement alone, they have invested $130 billion more—in strategic forces.

Senator WARNER. Over what period?

Dr. KEEL. Over the decade shown on the chart.

The consequence, of course, is a sustained advantage, if you will, in military investment. There has been deployment of greater numbers of forces, as well as higher quality forces.

In the case of strategic forces, from 1974 to 1980, the Soviets have produced over 1,500 ICBM's, compared to the U.S. figure of roughly 350. They have produced over 150 bombers, compared to none for the United States. They have produced over 1,200 SLBM's, as compared to roughly 300 for the United States. They have produced over 2 dozen ballistic missile submarines, compared to none from 1974 to 1980 for the United States.

In terms of qualitative improvements, they have increased their accuracy by a factor of between three and four. They have increased their payload by almost a factor of two. They have increased their reliability by about 10 percent.

So, today, Mr. Chairman, we are painfully aware of the improvements in forces. In fact, we are in a situation, in my view, where we are continuing to have inferiority in conventional forces. We now have inferiority in strategic forces. We have inferiority in theater nuclear forces. For a while, we were on the verge of inferiority in maritime forces.

Our success in meeting this challenge depends critically on your support and the support of the Congress in sustaining this commitment to increased defense spending.

In spite of the increase in defense spending that is contained in the President's budget, the Soviets will continue to outinvest us in weapons systems throughout the President's 5-year defense plan. The President's plan is a bold and courageous step, but we cannot do it overnight. It is not intended that we do it overnight, and we will need the sustained support of this committee as well as the Congress. Our appeal to you is for that support.

Thank you.

[The prepared statement of Dr. Keel follows:]

PREPARED STATEMENT BY HON. ALTON G. KEEL, ASSISTANT SECRETARY OF THE AIR FORCE, RESEARCH, DEVELOPMENT, AND LOGISTICS

Mr. Chairman and Members of the Committee, I welcome this opportunity to meet with you today to report on Air Force Research and Development, Acquisition and Logistics Programs and the fiscal year 1983 budget request for these programs. It is only appropriate that we start with a discussion of the threat we face as a nation from the Soviet Union and the Warsaw Pact countries. This threat determines the priorities as well as the substance of our fiscal year 1983 and Five-Year Defense Programs. Our decisions today will determine whether we develop and field those weapon systems needed to meet the Soviet challenge in the late 1980s and beyond. The need to meet this challenge comes at a time when domestic pressures are mounting for us to review, and perhaps, to revise our national priorities of defense versus nondefense spending. It is imperative in this environment that we review the threat and, hence, the need for our defense request.

In addition, I would also like to discuss our commitment to get the most out of the defense dollar. We are firmly committed to increasing efficiency and to reducing waste in our weapon system acquisition process. Furthermore, we are dedicated to improving supportability and maintainability of the systems we do procure. In short, we want to field cost-effective weapon systems which are fully supportable in the operational environment. We cannot afford to do less . . . and we will not settle for less.

Now, let me begin by addressing the Soviet challenge we face, as I view it. It is important as we examine and debate U.S. defense spending that we keep in perspective the magnitude of the Soviet buildup and the steadfast commitment on the part of the Soviets to sustain defense investment. It is thus of benefit to review and update the trend in Soviet military investment and to examine the consequences.

First, to appreciate fully the extent of the Soviet and Warsaw Pact commitment to national defense, it is interesting to make the following comparisons of resources between the Warsaw Pact and the Atlantic Alliance and Japan. The Alliance and Japan has a roughly two-to-one advantage in population or people resources over the Warsaw Pact. The Alliance with Japan has over a three-to-one advantage in gross national product, or gross domestic product over the Pact. Yet with this advantage in population and in national wealth, the size of the Alliance defense effort—priced in dollars—is only 10 percent more than that of the Pact.

This comparison does not tell us whether our defense effort is too large, too small, or just right. It does illustrate, however, that the size of the Warsaw Pact defense effort is three times greater as a percent of gross national product as that of the Alliance. Thus, it is difficult to sustain an agreement that we cannot afford more for defense if, in fact, we judge it is required.

To understand the significance of this relative comparison of total defense effort we must examine its components. In so doing we determine that in terms of so-called military investment—procurement of weapons, research and development for weapons, and military construction for support of weapon systems—the Warsaw Pact effort is significantly larger than the Alliance. Furthermore, the Warsaw Pact has been out-investing the Alliance in weapon systems since about 1972. In fact, the cumulative asymmetry in investment over the 10-year period from 1971 to 1982 now favors the Warsaw Pact by about $100 billion. But even this comparison of military investment between the Warsaw Pact and the Alliance does not truly reflect the total inherent advantage that the Warsaw Pact accrues from this edge in investment.

There are other considerations which make this advantage greater.

First, the Soviet Union contributes 90 to 95 percent of the total military investment of the Warsaw Pact, and hence imposes control over use of those resources. The United States effort, on the other hand, constitutes about 60 percent of the Alliance military investment. With the Soviet Union in control of almost all of the Warsaw Pact military investment, the result is a more efficient and effective use of those resources. There is less duplication and less redundancy in forces and in military capability. Secondly, and perhaps most significantly, there is greater efficiency through procurement of larger numbers of given types of weapon systems.

Thus, the "effectiveness" of the Alliance military investment as compared to that the Warsaw Pact is clearly less or the advantage to Warsaw Pact in "effective" military investment is even greater.

To put the magnitude of the Soviet defense commitment in true perspective, we must compare directly Soviet military investment to U.S. investment. In making that comparison, we find that the Soviet Union today is out-investing the U.S. in weapon system almost two-to-one. Over the last decade the dollar costs of Soviet efforts have exceeded those of the U.S. by over $400 billion more in weapon systems than has the U.S.—$230 billion more in procurement of weapon systems, $100 billion more in research and development for future systems, and $70 billion more for military construction to support weapon systems. In fact, the Soviet Union's investment efforts have been larger than those of the U.S. for about the last 15 years.

It is significant to note that a sustained gap between U.S. and Soviet military investment will persist through the period of the President's fiscal year 1983 Five-Year Defense Plan, even with the projected increases in defense spending. The Soviet Union has been, is now, and will be investing more in defense—even with the President's new Five-Year Defense Plan. Yes, the President's plan is a bold start which will begin to reverse adverse trends in the military balances. But it cannot be done in a few years, and that is not our intent. To meet the challenge, we must sustain a continuous, steadfast commitment to allocating sufficient resources for defense.

The military benefit to the Soviet Union, owing to their advantage in military investment, manifests itself into two principal ways.

First and most obvious, the advantage in military investment has correlated into a substantial Soviet Union advantage in numbers or quantity of weapon systems, especially in conventional forces. Secondly, this steady, sustained Soviet advantage in military investment has also now translated into an unprecedented pace of modernization of Soviet military forces. The consequence of which, of course, is higher quality weapons. We can both these trends if we examine Soviet fighter production, as a typical example.

In total tactical fighter production the Soviets are out-producing the U.S. by better than 2½ to one. Over the decade of the 1970's the Soviets produced more than twice the number of fighter aircraft as the U.S. The production rate of the Soviet Flogger alone exceeds all U.S. fighter aircraft production. With the Soviet rate of aircraft production, we could replace our entire active U.S. Air Force Tactical Fighter Force every seventeen or eighteen months. With the USAF rate of fighter aircraft production planned for fiscal yuear 1983, it would take us over twenty-five years to replace the Soviet tactical fighter force.

In fact, overall, the Soviets are out-producing the U.S. in weapon systems about three-to-one, while the estimated dollar cost of the Soviet effort exceeds ours by two-to-one. The Soviets accomplish this not by buying simpler less expensive systems but by using the leverage of greater military investment to take advantage of the economies of scale. With the advantage in military investment, the Soviets buy more systems at more economical rates, and thus at lower unit weapon system costs than would otherwise be possible.

With this advantage in aircraft production, the Soviets have attained and maintained a numerical superiority. Moreover by sustaining this rate of production, this advantage has translated into a Soviet pace of fighter aircraft modernization which far surpasses that of the U.S. The consequence has been an increasingly modern Soviet air force.

So as a result of the sustained Soviet military investment, today about two-thirds of their 4,500 air-to-air fighters are new generation aircraft—the so-called "third generation" aircraft, such as the Mig-23 and Mig-27 Flogger, the Mig-25 Foxbat, and the SU-24 Fencer. The new generation aircraft are replacing the older second generation aircraft—the Mig-19 and Mig-21 series and so on. More impressive perhaps is the fact that within the next year or so the Soviets will begin introducing their next fourth generation aircraft. So they are programmed to begin introduction of their future generation aircraft before they even complete the current introduction of their new aircraft. The obvious result, of course, is that the Soviets are extensively modernizing their air force with more and more capable aircraft. The average age of their fighter force is about 5½ years—or about one-half the average age of the U.S. fighter force.

The next pertinent question is how capable are the new Soviet aircraft. The simple answer is—quite capable. Comparisons of USAF F-15 and F-16 aircraft with the new generation Soviet aircraft as well as the future generation Soviet aircraft indicate areas where the Soviets have an advantage—average speed, thrust-to-weight ratio, air-to-ground combat radius.

In short, the conclusion is that the new Soviet aircraft are indeed highly capable. The Soviet air force represents a formidable offensive threat and is attaining an increasing ability to project force.

Similar conclusions can be reached with respect to the evolving U.S.-Soviet military capability and with respect to the shifting U.S.-Soviet force balance from analyses of other mission areas. The Soviet's publications document their own stark and sobering conclusion.

On the cover page of the January 15, 1980 edition of the Soviet Red Star publication, the Soviets state: "With respect to the military balance, the correlation of forces has shifted." Based on the evidence, it is difficult to argue with this statement. The Soviets also assert that the balance has shifted "Once and for all and irrevocably." This assertion is unacceptable! The challenge we face is to make sure that this will not be the case.

Our success in meeting this challenge will, to a great extent, depend upon our maintaining a continuing commitment to rebuilding our nation's defenses. We are beginning to make progress. Over the past few years, we have had real growth in funding, and our Fiscal Year 1983 request is another strong step forward toward meeting the Soviet challenge. We must not waiver from our commitment. The threat has not diminished, nor should our resolve.

STRATEGY FOR THE 1980'S

Mr. Chairman, as indicated by the above discussion, it is clear that we face an adversary with serious long term goals incompatible with our own, whose defense efforts far surpass legitimate defensive needs. We must therefore undertake a sustained effort to increase the ability of the United States and our allies to protect our common interests and to deter any use of force.

The United States remains committed to a defensive use of military strength. Our objective is to deter aggression or to respond to it should deterrence fail. It is not to initiate warfare or pre-emptive attacks. This requires that our military forces be prepared to respond after the enemy has taken the initiative and to react so strongly that our counterattacks will inflict unacceptably high cost on the enemy—a requirement that puts a heavy burden on our readiness and intelligence capability.

This places the highest priority upon assuring that we have military forces and the command, control, communication and intelligence (C^3I) that can respond to a variety of potential crises of extended duration.

Let me highlight our Air Force programs designed to meet our defense requirements.

STRATEGIC SYSTEMS

Over 40 percent of the fiscal year 1983 Air Force RDT&E program is devoted to strategic offensive and defensive forces. This emphasis is dictated by the need to upgrade our strategic capabilities and to redress the imbalance in U.S.-Soviet strategic forces. The fundamental objective of our strategic nuclear forces is to deter nuclear attack. In light of substantial Soviet commitment to strategic force buildup, the ability of our strategic forces to maintain their deterrent value must be ensured by a series of steps for force modernization.

Last October President Reagan announced a comprehensive plan for strategic force modernization. The intent of our program is to strengthen deterrence of nuclear war by denying the Soviets any realistic prospects of gaining an advantage by initiating the use of nuclear weapons. Survivability and endurance are key attributes of this plan.

There are five mutually reinforcing elements of the Reagan program: (1) improvements in strategic command, control, and communications (C^3) systems: (2) modernization of our strategic bomber force; (3) development of new submarine-launched ballistic missiles; (4) a step-by-step plan to improve the capability of our ICBM's and to reduce their vulnerability; and (5) improvements in strategic defense. The Air Force is responsible for carrying out much of the President's strategic program.

Over the past decade we have developed impressive C^3I capabilities for peacetime use. However, we have not made these systems as survivable as we would like, nor have we provided a reliable post-attack C^3I system. Thus the President's program placed the highest priority to improvements in our warning systems, command and communication links, including the capability of a post-attack reconstitution to ensure enduring C^3I. These improvements, which are supported in the Air Force budget, are intended to ensure that we can effectively employ our nuclear forces throughout all stages of a conflict and thus maintain a credible deterrent.

A critical and growing challenge facing us today is improving the capability and survivability of our land-based ICBM forces. The MX missile under development is the cornerstone of our plan to improve ICBM capability. A key objective of our plan is a survivable and enduring basing mode. Several options are being evaluated and a selection of the preferred mode will be made in July 1983.

The Army has the lead in pursuing ballistic missile defense (BMD) alternatives that represent evolutionary improvements over concepts of the past. The Air Force is working closely with the Army to assure effective coordination of BMD efforts with our MX deceptive basing efforts. It is essential that full cooperation and communication be achieved and all levels of management are dedicated to accomplishing this.

Historically, the unique military characteristics of the manned bomber have provided a vital dimension of flexibility to our strategic and tactical forces. Bombers are the only element of the Triad that can be launched prior to a decision to employ these weapons.

The B-52s have been the mainstay of our manned bomber forces for the past 25 years, but their ability to continue to serve effectively in the penetration mission is diminishing.

The limitations inherent in the B-52 make it imperative that we start fielding a replacement aircraft now. We have begun a timed-phased bomber modernization program designed to produce 100 B-1Bs which will have an initial operational capability (IOC) in 1986 and produce an Advanced Technology Bomber (ATB) with an estimated IOC in the early 1990s.

Acquiring the B-1B while continuing to pursue the ATB is the most prudent approach for revitalizing our bomber forces. This approach enables us to field the necessary additional forces required during a period when the United States must depend heavily on bombers, while we take the proper steps to strengthen our land-based missiles. It will also provide time for an orderly and logical development pace of the ATB to capitalize on this important technology and avoid the costly major redesigns likely in a too rapidly paced program. In addition, a combined force of B-1Bs, ATBs, and cruise missiles will place maximum stress on Soviet air defenses and provide the United States with significant leverage in our long-term strategic competition with the Soviets.

We are continuing development and procurement of the Air Launched Cruise Missile (ALCM), the only major near-term initiative we have to counter the growing expansion of Soviet strategic capabilities. The ALCM enhances our bomber's capabilities by providing greater weapons accuracy, increased flexibility for bomber routing and targeting, reduced bomber exposure to defense, and defense saturation.

Tanker aircraft are a vital part of our bomber and conventional forces. In the KC-135 program, the major effort is to replace the current engines with CFM56 modern technology engines. Reengining with CFM56 is the most cost-effective means of alleviating a serious and growing tanker shortfall. In addition, the new engines will offset the high and growing costs of operating and maintaining the present aging engines.

In the area of strategic defensive systems, we have large gaps in radar coverage provided by the North American Defense Warning Network, our strategic air defense interceptors are obsolete, and our anti-satellite and ballistic missile defense programs have lagged behind those of the Soviets. As indicated above, the President's program calls for vigorous research and development on ballistic missile defense. It also takes the first steps toward improving the other components of our strategic defensive forces.

The North American air surveillance network will be upgraded in coordination with Canada. The plan includes some combination of over-the-horizon backscatter (OTH-B) radars, AWACS aircraft, and improved versions of the ground radar systems that exist today. It also calls for replacing the aging five squadrons of F-106 interceptors with new F-15s. Additional AWACS aircraft will augment the ground-based radars in peacetime and will provide surveillance and control for interceptors in wartime. We also plan to continue to demonstrate an anti-satellite system as a counter to the capability already demonstrated by the Soviets.

SPACE-RELATED ACTIVITIES

Finally, Mr. Chairman, I want to conclude this part of the statement with a brief discussion on space and space-related systems. Our space systems have unique capabilities enabling many missions to be accomplished more efficiently than with earthbound systems. The United States is becoming increasingly reliant on these systems for such missions as navigation, communications, and surveillance and this dependence will increase.

We are developing navigation systems such as the NAVSTAR Global Positioning System that will provide extremely accurate position and navigation information, to be used by all services as well as the civil sector. We also have requirements for expanded global communications from space as well as highly jam-resistant and survivable satellite communication for tactical and strategic command elements.

The importance of space systems for the United States is well realized by the Soviets, who have the world's only operational Antisatellite CASAT) system. To ensure our systems are available when needed, we are examining methods to increase survivability. The United States also recognizes the value of Soviet space systems and is developing an ASAT system to ensure that space does not become a Soviet sanctuary.

In addition, the Department of Defense is committed to the Space Shuttle and has worked closely with NASA to develop methods of exploiting the Shuttle's capabilities. The Air Force is developing the Inertial Upper Stage booster and building a Shuttle launch capability at Vandenberg AFB to support civil and military missions requiring higher orbit inclinations, which cannot be flown from Kennedy Space Center. The Vandenberg launch facilities are planned to support an October 1985 initial operating capability.

CONVENTIONAL FORCE PROGRAMS

Turning our attention now to conventional forces, the major threat facing our general purpose forces continues to be the numerically superior forces of the Soviet Union/Warsaw Pact. Western strategy has relied heavily upon technological superiority to offset this quantitative advantage. Accordingly, we are pursuing carefully selected general purpose programs which enhance the flexibility, deployability, firepower, and relatively quick response to our tactical air force.

The most demanding conventional threat the United States must deter and counter is an attack on Western Europe by the Warsaw Pact. To meet the Soviet challenge, we have constructed a force improvement plan for maintaining our qualitative edge. In the near term, we will develop evolutionary improvements to our exisiting fighters while continuing balanced procurement of the F-16 and F-15.

To deal with our disadvantage in numbers as well as the dense defenses of the Warsaw Pact, we are emphasizing weapons that achieve much higher effectiveness through accuracy and lethality, while reducing aircraft attrition through standoff or reduced exposure.

Over the last few years Soviet tactical air has changed from primarily a limited range defensive force to a formidable offensive force.

They now have the capability to conduct strikes against targets anywhere in NATO Europe. To meet this challenge, the Air Force must continue to procure and improve F-15 and F-16 fighter aircraft. Our RDT&E emphasis is on increasing the air-to-air capabilities of our fighters. The most important improvement under development is the AMRAAM, employing technology which gives it a high kill probability from standoff ranges.

Soviet air defense systems continue to grow in density, quantity and complexity as the Soviets develop and deploy new tactical and strategic air defense systems. These new systems emphasize mobility and use both radar and electro-optical means for target acquisition and tracking. Growth in their air defense capability has also been marked by increased reliance on command, control, and communications as they strive to maintain a highly reliable, efficient, and integrated system.

Because of this growing threat, we have and will continue to place considerable emphasis on electronic combat. Our objective is to achieve a mix of systems which disrupt, degrade, deceive, or destroy an enemy's air defense network in order to ensure the survivability of our aircraft and aircrews. To accomplish this, we have programmed updates for our operational defense suppression systems, as well as continued development of several new systems to handle the highly sophisticated Soviet threat.

To protect our global interests, the U.S. deploys some forces forward, pre-positions limited amounts of material, but maintains the majority of our forces and supplies at home. These home-based forces, supported by mobility resources, serve as a centrally located strategic reserve which can be projected anywhere in the world.

Airlift is the most visible, responsive, and flexible element of our mobility resources. Its primary role is to project and sustain combat forces until other means of transportation can deliver the required follow-on support. In many situations, airlift is the only means of responding rapidly, because of either the geographic location or the speed with which the threat develops.

Existing airlift is seriously inadequate to meet the mobility requirements of our conventional war strategy. The Air Force RDT&E and procurement strategy will begin correcting the airlift shortfall. We have ongoing programs to improve the readiness, sustainability and capabilities of our current aircraft. Our programs include increasing spare part stocks and crew ratios to permit higher utilization rates of our C-5 and C-141 aircraft. In addition, we plan to increase inventories of C-5 and KC-10 aircraft.

To make full use of our investments in modern weapon systems and munitions we must make similar investments in readiness and sustainability and thus assure that our forces are ready for combat on short notice and capable of sustained military operations over a considerable period. We must have the proper mix of modern equipment and well trained, dedicated people supported by modern repair facilities, sufficient spare parts, and adequate stocks of effective munitions to achieve such readiness and sustainability.

In our fiscal year 1983 budget submission, we have continued to place priority emphasis on improving the combat preparedness and staying power of our forces. This is necessary in view of the significant deficiencies in our present ability to sustain effective combat and the very real possibility that we may be required to use military force to defend our global interests over the next few years.

TECHNOLOGY INITIATIVES

Now, I would like to discuss another aspect of meeting the Soviet challenge—namely, maintaining our technological edge. The nature of our worldwide commitments almost guarantees that our forces will be outnumbered, especially in the crucial early phases of conflict. Today we have that technological edge which can alleviate some of this imbalance. However, while maintaining their dedication to overall numerical superiority, the Soviets are narrowing the technology gap.

We must continue a strong research, development, test and evaluation program which investigates technology that will enable us to counter future threats and correct military deficiencies. The goal of our Technology Base Program is to use advanced technology to develop more effective weapons that are also reliable, maintainable and, above all, affordable.

The fiscal year 1983 Technology Base program is our response to the challenges to our future. It provides a lean focused foundation for national initiatives in science and technology to exploit promising breakthroughs for operational usage.

As indicated we will emphasize technology application to make our system more reliable, more maintainable and in general more supportable.

In the area of logistics, for example, the demands of our new and future weapon systems and the diversity and dynamics of logistics force structure underscores the importance of a comprehensive logistics R&D program. Logistics employs over 40 percent of our Air Force work force and accounts for 30 percent of the dollars which directly affect readiness and force sustainability. Research and development is needed to assure the supportability of our emerging weapon systems and to gain knowledge of how logistics force structures must operate in the future.

A logistics long-range planning program is now being used to determine research requirements. We are strengthening the management structure and funding of the laboratories in both the technology base and engineering development. Laboratory development efforts which once focused exclusively upon performance improvements are now giving due consideration to supportability and cost.

Programs have been started to evaluate diagnostic and built-in test techniques to improve weapon system and component maintainability and to reduce the burden of maintenance at the unit level. We are examining battle damage repair concepts to enhance our war fighting capability. In addition, we see such electronic technologies as Very High Speed Integrated Circuits (VHSIC) and solid state active aperture radar modules having the potential of appreciably improving our current capabilities for both performance and support.

The United States strategy for dealing with the Soviet military challenge is critically dependent on the effective exploitation of the broad based U.S. technology. During the past year, the Defense Science Board conducted a Summer Study on the technology Base and made recommendations aimed at improving the responsiveness of the Technology Base to national security needs. Additionally, other initiatives were begun this past year for improving the Service Laboratories, increase the university involvement and maintain a viable, highly trained scientific workforce. I can assure you the Air Force is working very closely with the Office of the Secretary of Defense and other Services to make sure that we are getting the most out of our Technology Base dollar and people resources.

EFFECTIVE MANAGEMENT

Mr. Chairman, I would like to conclude with a discussion of the complementary aspect of increased defense spending—namely, the need to get the most out of every defense dollar. To get the most out of what we spend; we must not only strive to maximize efficiency and reduce waste but also to invest wisely for the future. In that regard, we must never lose sight of the need for a healthy and productive technology base as indicated above . . . small investments today can save us significant costs tomorrow.

Another challenging responsibility of the Air Force is to prepare and implement policies which provide for effective resource management of current and planned weapon system programs included in the budget. In response to the initiatives of the Congress, we are decentralizing program management responsibility, implementing new management policies, and stressing energy conservation.

In accordance with overall Department of Defense guidance, the Air Force is now operating under a policy of "controlled decentralization". This gives the Air Force flexibility in developing specific policies to meet unique requirements, as well as allowing decisions to be made at the lowest level at which a total view of a given issue exists. Through controlled decentralization, milestone decisions on specific programs have been allocated to the Air Force System Acquisition Review Council, which I chair, and the Air Force major acquisition commands. In response to Congressional direction, we are also currently revising program reporting thresholds for all responsible decision levels.

The key management initiatives being implemented by the Air Force are multiyear procurement, economic order quantities, increased contract competition, incentives to improve reliability and support and policies to eliminate fraud, waste and abuse. The overall effect of these policies is to stabilize and improve our industrial base for defense programs while achieving economies for the Air Force.

We are making a concerted effort to increase the level of competition achieved in our contract awards. Under the aegis of the Defense Acquisition Reforms, actions are being taken to remove impediments to competition, where possible.

Over the last decade, our experience in fielding modern weapon systems has been one of persistent growth in weapon system support costs. In a concerted effort to reduce weapon system costs and control life cycle costs, we have prepared a product performance guide of potential incentives that can be used on appropriate acquisition programs.

With respect to fraud, waste and abuse, the Air Force has initiated several programs directed at recognizing, reporting, and eliminating these problems, especially as they relate to Air Force acquisition programs.

Mr. Chairman, I can assure you that these management initiatives have my personal attention and commitment. In today's environment of economic constraints, it is not enough to emphasize just the need for increased support of defense but also to commit to getting the most out of that support once it is given. There is no room for waste and inefficiency.

In conclusion, I would like to point out that the program represented by the Air Force's fiscal year 1983 budget request was constructed with considerable deliberation regarding required military capability, program priorities, and available resources. In order to take advantage of economic savings available on some programs, others had to be eliminated.

These hard decisions which have reduced or eliminated other programs should not be viewed as a reduction in our military requirement for these capabilities. Those decisions were tough, but so are the times. What we finally decided on are the absolute essentials to meet the Soviet challenge. There is no fat. With each succeeding year that we delay our response the challenge that confronts us becomes that much more formidable. There is now no time to delay. The time to act is now. We must continue to sustain full support for restoring our nation's military forces. The President's program is adequate to do so, but it will not do it overnight. It will take time and your dedicated, unequivocal support. We solicit that continued support.

Dr. **Keel**. If I may, Mr. Chairman, I would like now to turn to General Burke for some summary remarks.

Senator **Warner**. Thank you.

General, please proceed.

STATEMENT OF LT. GEN. KELLY H. BURKE, USAF, DEPUTY CHIEF OF STAFF FOR RESEARCH, DEVELOPMENT, AND ACQUISITION, ACCOMPANIED BY BRIG. GEN. JAMES P. McCARTHY, USAF, SPECIAL ASSISTANT FOR MX

General **Burke**. I am ready to move into the briefing, sir, if you are ready.

Senator **Warner**. Yes, indeed.

General **Burke**. I know that this committee has pondered long and hard the problems that Dr. Keel has just referred to, the shifting balance during the decade of the 1970's.

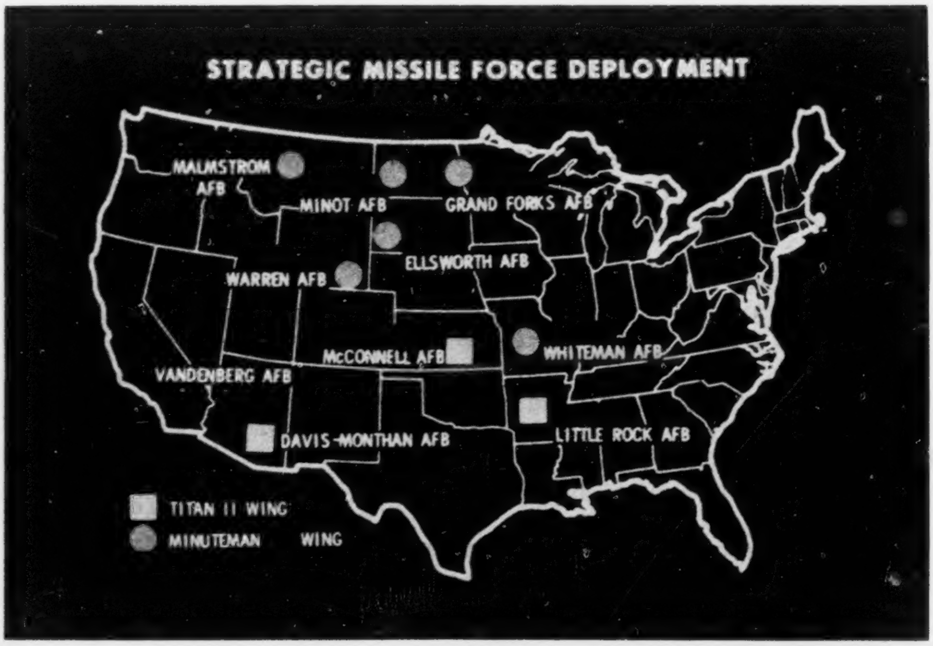
I have thought of it, too.

I recently came across this clipping from a Soviet military magazine. It is interesting to see their perspective, their use of the term "correlation of forces"; it's about the way we use "military doctrine."

I don't think we can argue with the first half of that, though I do think we can argue with the second.

We move from this to the subject of land-based deterrent. I have here an agenda, to refresh your memory, of the topics you have asked for. Yesterday we talked of the theater nuclear forces. Today we will be talking about the land-based deterrent, and later, the remaining items, as shown on the chart.

Today I would like to say just a few words about the existing ICBM forces of the country and then move into the question of the MX.


STRATEGIC MISSILE FORCE DEPLOYMENT
MALMSTROM AFB
MINOT AFB
GRAND FORKS AFB
ELLSWORTH AFB
WARREN AFB
McCONNELL AFB
WHITEMAN AFB
VANDENBERG AFB
DAVIS-MONTHAN AFB
LITTLE ROCK AFB
TITAN II WING
MINUTEMAN WING

General Burke. We have our missiles based throughout the continental United States at nine operational bases, as shown, plus at Vandenberg, in California, where we don't have operational missiles, but we do all operational testing there and we do have troop training there, which is important.

The Titan bases are shown in yellow. There are three of them. Minuteman are in green, and there are six of them.

We did have 54 Titans, 18 at each of those 3 locations. We had 2 silos damaged, so the total number now is 52. We have 1,000 of the Minuteman—550 Minuteman II and 450 Minuteman III.

Among all of the forces we have in the U.S. military, the most ready are our land-based ICBM's. There are virtually on 100 percent alert and are ready at any given moment.

The oldest missile that we have is the Titan. It went into silos in the early 1960's. We have had some problems with it, but we have corrected the defects as we have uncovered them. I think it is a safe and effective missile right now.

Nonetheless, the decision has been made to retire Titan beginning this fall, completing in 1987, with a retirement rate of about one a month. That decision was made primarily for financial reasons, in order to save the money that otherwise would be spent, which adds up to about half a billion dollars between now and 1987.

As we retire them, we will return those silos to caretaker status. We will preserve the missiles with a view toward using them for space efforts or ballistic missile defense testing. We also will save that fuel, which is quite valuable.

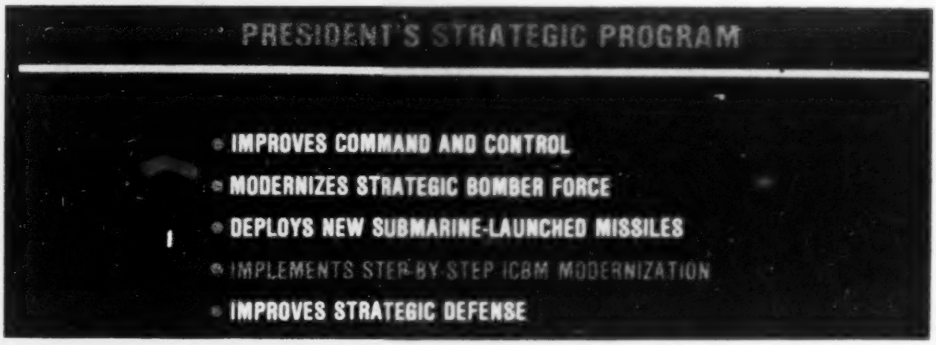
The mainstay of the missile force, then, will be the Minuteman, 1,000 of them, with 550 MIRV'ed Minuteman III's and the remaining as Minuteman II's.

That missile is in good shape and we intend to keep it that way. We are making some improvements to Minuteman. We are completing the MARK 12A warhead upgrade program on 300 of those missiles. That is to be completed in 1983. We will begin production on the lithium batteries that will give us the longer surviving power component.

Upon congressional suggestion, we are going to deploy and additional 50 Minuteman III's at Malstrom AFB. This will add 100 warheads to the force which, in warhead numbers, would more than offset the 52 Titan II's that will be retiring. But you will get a different picture if you look at megatonnage.

Some modest improvements to guidance and software upgrades will take place. We will continue upgrading the communications system with changes. With any equipment of that age, there will be ongoing reliability and maintainability modifications. That adds up in the 1982 budget to $163 million.

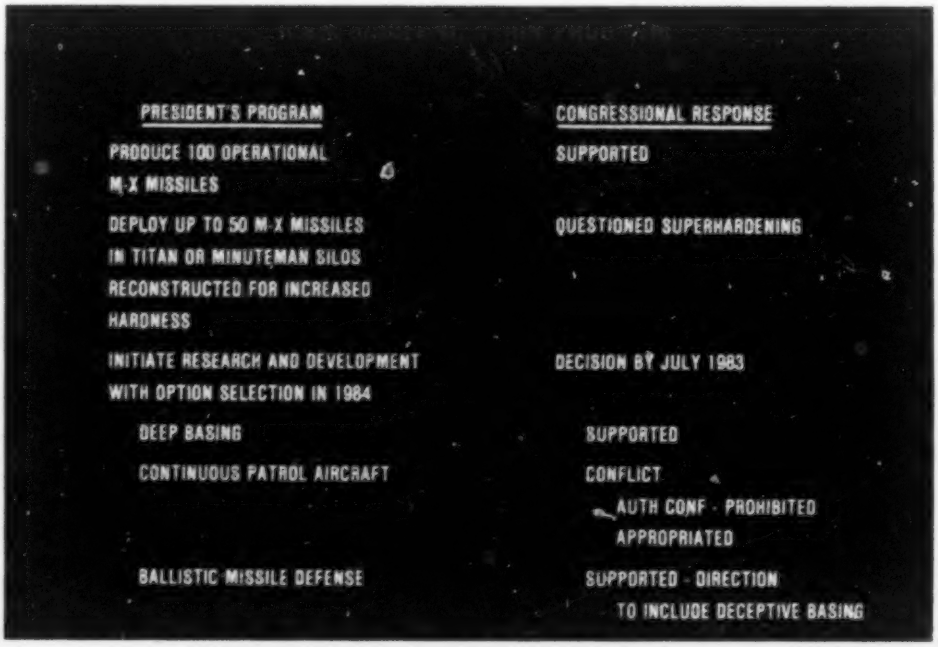
Moving from where we are today to where we hope to go, I would like to talk a little bit about the MX.



PRESIDENT'S STRATEGIC PROGRAM

- IMPROVES COMMAND AND CONTROL
- MODERNIZES STRATEGIC BOMBER FORCE
- DEPLOYS NEW SUBMARINE-LAUNCHED MISSILES
- IMPLEMENTS STEP-BY-STEP ICBM MODERNIZATION
- IMPROVES STRATEGIC DEFENSE

General **Burke**. Again, this is a reminder that for the five point strategic modernization program the President talked about—a step-by-step ICBM modernization effort.



PRESIDENT'S PROGRAM	CONGRESSIONAL RESPONSE
PRODUCE 100 OPERATIONAL M-X MISSILES	SUPPORTED
DEPLOY UP TO 50 M-X MISSILES IN TITAN OR MINUTEMAN SILOS RECONSTRUCTED FOR INCREASED HARDNESS	QUESTIONED SUPERHARDENING
INITIATE RESEARCH AND DEVELOPMENT WITH OPTION SELECTION IN 1984	DECISION BY JULY 1983
DEEP BASING	SUPPORTED
CONTINUOUS PATROL AIRCRAFT	CONFLICT AUTH CONF - PROHIBITED APPROPRIATED
BALLISTIC MISSILE DEFENSE	SUPPORTED - DIRECTION TO INCLUDE DECEPTIVE BASING

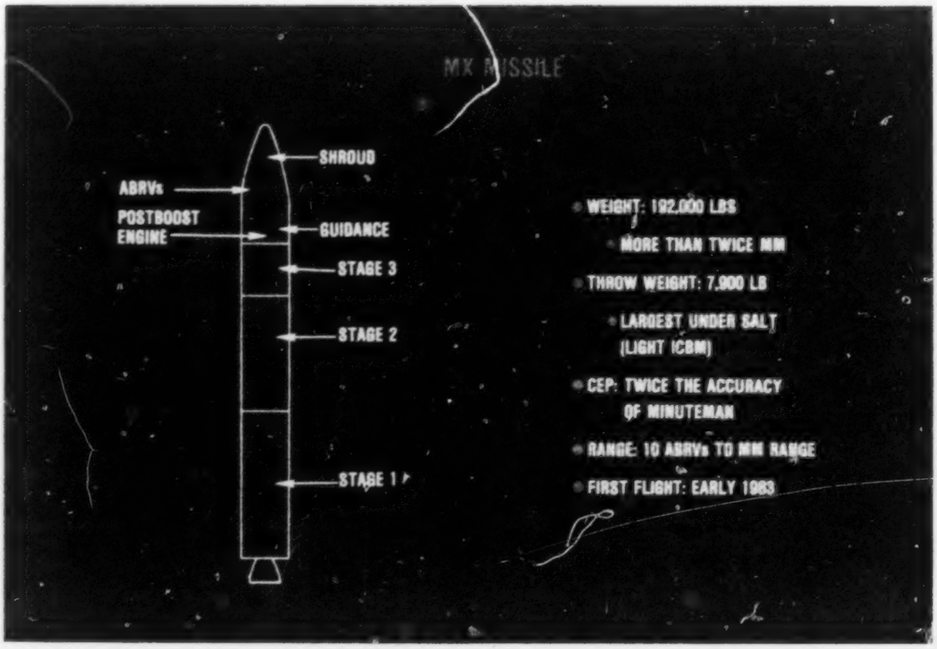
General **Burke**. He spelled that out in some detail in his announcement. These were the elements of his proposal.

On the right is the congressional response. He said we should produce 100 operational missiles, to which Congress agreed. He said we should deploy up to 50 of those missiles in either Titan or Minuteman silos, reconstructed for increased hardness. Congress agreed with the general proposition, but questioned the superhardening aspect. Since then, the administration has abandoned the superhardening for interim basing and, in effect, will put them in with minimum modification.

This [indicating] is the near-term and temporary portion. In the long term, the survival basing solution is below, here [indicating]. There are three alternatives: deep basing, continuous patrol aircraft, and ballistic missile defense. The administration proposed to do that and make a decision in 1984. Congress moved that up a year. We will try to work with that schedule.

Deep basing was supported. Congress questioned the continuous patrol aircraft system and we are not spending any money for that purpose at the moment. Congress supported the ballistic missile defense, which is the largest investment of the three. But it added some direction to include, as part of the ballistic missile defense effort, deceptive basing of the MX missile. We were directed to spend at least $25 million for that purpose.

General **Burke**. Let me move from the President's proposals and the congressional guidance, and cover the near-term and the long-term plans we developed to accomplish those things.



MX MISSILE

- WEIGHT: 192,000 LBS
  - MORE THAN TWICE MM
- THROW WEIGHT: 7,900 LB
  - LARGEST UNDER SALT (LIGHT ICBM)
- CEP: TWICE THE ACCURACY OF MINUTEMAN
- RANGE: 10 ABRVs TO MM RANGE
- FIRST FLIGHT: EARLY 1983

General **Burke**. For the near-term, a major effort is the completion of the development effort on the missile itself. Just to refresh your memory, it is a 92-inch-diameter missile, weighing 192,000 pounds, which is quite large, compared to a Minuteman III at 78,000. But still, in SALT lexicon, it is a light missile, comparable in throw-weight to the SS–19. It is much more accurate than the Minuteman, and will carry 10 of the Advanced Ballistic Reentry Vehicles to the desired range.

We are looking for a first flight in 1983. The major difference from last year is we have changed our baseline reentry vehicles from the Mark 12A to the Advanced Ballistic reentry vehicle. You might like to go into why we did that.

I would like to show a very brief film on what we have done in the past here. We have had a lot of success with this program. We have successfully demonstrated the ejection of the canister from the silo. We have a number of test firings of each of the four stages of the missile—the three solid stages, plus the postboost vehicle. We have shown the separation of the shroud, and, in general, we have demonstrated all of the elements of the missile.

[A film was shown.]

General **Burke** [explaining film]. This is a mockup of the canister. It is going to go into a vertical silo at our test ground in Nevada. A dummy missile of a weight equivalent to MX will be employed in the canister within the silo, and then it is to be expelled from that canister by gases created by a gas generator.

This, of course, is a cold-launched missile, the first land-based one we have built.

There it is shown being expelled. At this point, it will ignite and be on its way. In this case, of course, it is just a test missile, so it falls back.

This is the same thing in slow motion. It comes out of there with a very tight fit. There is a seal that helps create the air pressure to drive the missile out.

The first stage is built by Thiokol, in Utah. It is a very large stage. They built the motors for the space shuttle. It is 110,000 pounds.

You can see clearly here the oscillation of the nozzle, which helps guide the missile during flight.

This is a solid rocket.

This is the second stage. The second and third stages incorporate a new technology, which is working just fine. You can see it there. It is an extendable nozzle. It will make better use of the propulsion whatever portion you have here and getting a better expansion ratio by extending the cone. It kind of works like a Boy Scout's telescoping drinking cup coming out.

Stage 3 is the same sort of thing. This is made by Hercules. It also has that extendable nozzle. This is working fine. That was one of the development risks that we had, but we think we are OK with it.

You can see the nozzle coming out now.

Here it is, fully extended.

The fourth stage is also called the postboost vehicle. It uses liquid fuel. You will see its nozzle here, and you will see it come on and off.

There is the nozzle [indicating]. You will notice that nothing is coming out of it. But, in a minute, you will see an orange glow as we turn that on and off, to steer the postboost to the precise point that you want. It also is oscillating.

That is one of the main differences between an SLBM and an ICBM [indicating]. In an ICBM you use the liquid fuel. The submarines do not.

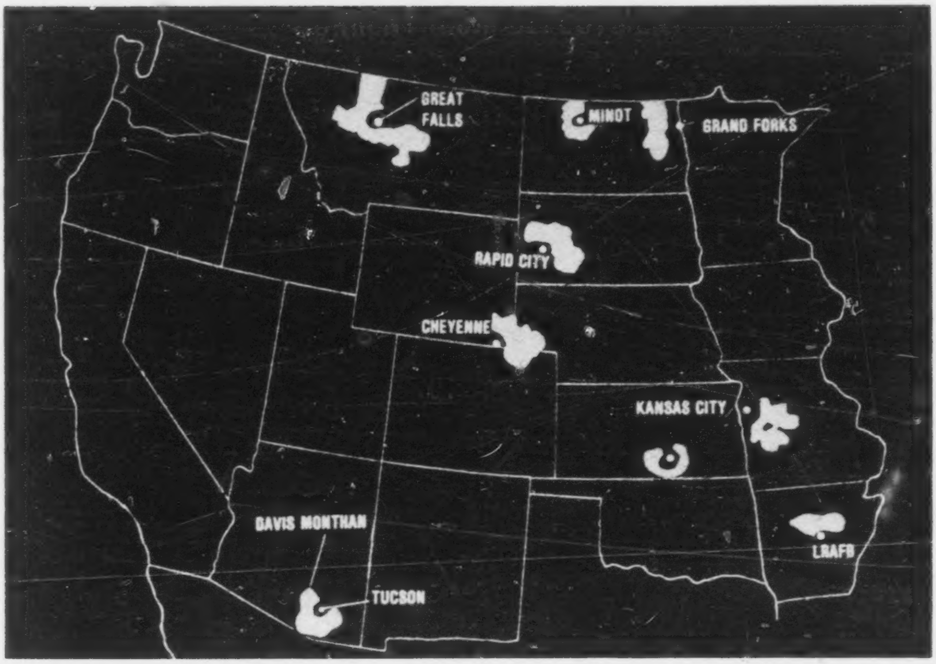
Here it is, being ignited.

The reentry system is covered by this shroud, which is separated at about 250,000 feet, at the point the missile goes exoatmospheric.

You might have seen that covered in "Aviation Week" about a month ago. It made a pretty picture.

We have more footage of our facilities out at Vandenberg, but we will not show that to you now.

Before I leave the missile, by way of summary, let me say that it is a very, very successful development program. We are meeting all of our technical goals. It is on time, at cost, and we have confidence that it will continue so.



Regarding the MX, the interim basing silos, the decision, of course, was to put at least 40 of these into the Titan or the Minuteman silos. A fairly cursory review, however, led us to believe that Titan was not a good choice and for several reasons such as that Minuteman was more compatible with ballistic missile defense. So, early on, we recommended to the Secretary of Defense that he drop the Titan and focus on the six Minuteman fields.

He has agreed with that, and fairly soon, we plan to make a recommendation to him as to which of those six it will be.

General Burke. The concept looks like this. [Slide deleted.]

The MX is so large that, once assembled, it cannot be transported over existing roads. It would require a million pound vehicle. So we will assemble the missile on site, in the silo, which is different than the way we do the Minuteman.

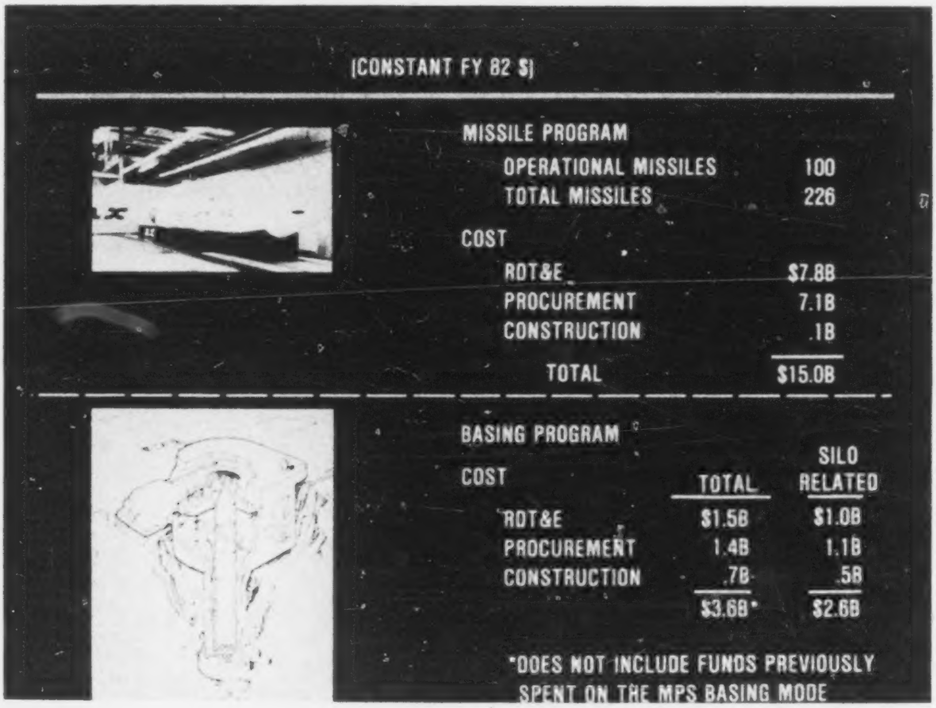
The way it would work is, the transporter would bring in the stages, one at a time. The first stage weighs 110,000 pounds and adds up to about 200,000 on the transporter, as compared with 125,000 for the current Minuteman transporter loaded with a booster. So, wherever we go, we are apt to have to do some shoring up of bridges to make these movements.

The stage will be towed in by the transporter. The canister already would have been in place, and the first stage would be put into the canister and would ride on an air elevator. The air elevator seal is the same seal that allows the missile to be expelled during launch. After the first stage is employed, it will be lowered, and the second stage would be connected. We will walk the missile down into the canister as we add components.

All of that would take probably 8 to 10 days.

General **Burke**. We would do that in the existing Minuteman silos. Here is an actual photograph of one. It is about a 2½ acre area, within the fence. You can see the green of the field right next to it.

None of that would change. All of this work would take place inside the fence and would not require any additional land. Once the work was completed, there would be no observable differences from the way it looks right now.



(CONSTANT FY 82 $)

MISSILE PROGRAM

OPERATIONAL MISSILES	100
TOTAL MISSILES	226
COST	
RDT&E	$7.8B
PROCUREMENT	7.1B
CONSTRUCTION	.1B
TOTAL	$15.0B

BASING PROGRAM

COST	TOTAL	SILO RELATED
RDT&E	$1.5B	$1.0B
PROCUREMENT	1.4B	1.1B
CONSTRUCTION	.7B	.5B
	$3.6B*	$2.6B

*DOES NOT INCLUDE FUNDS PREVIOUSLY SPENT ON THE MPS BASING MODE

General **Burke**. As I mentioned earlier, we are not planning superhardening or any increased hardening, but simply will take the hardness that is inherent in the silos and in the canister system, and we would estimate that the MX would be just about as hard as the Minuteman it replaces.

This [indicating] is a Minuteman III. Its shock isolation system is here [indicating]. The missile comes out, that shock isolation system has to come out, a new shock isolation system replaces it, and then the canister and the MX missile go in.

General **Burke**. We are retaining as much of the old equipment as we can. Let me say a word or two now about cost.

We often talk about separating the missile from the basing, which is hard to do. But I have tried in this slide to separate it.

In constant 1982 dollars, for simplicity, we will buy 100 operational missiles. But this is a total buy of 226, and this is because with any missile like that, you continue to test it for its operational life. So, there are additional test missiles, included in that.

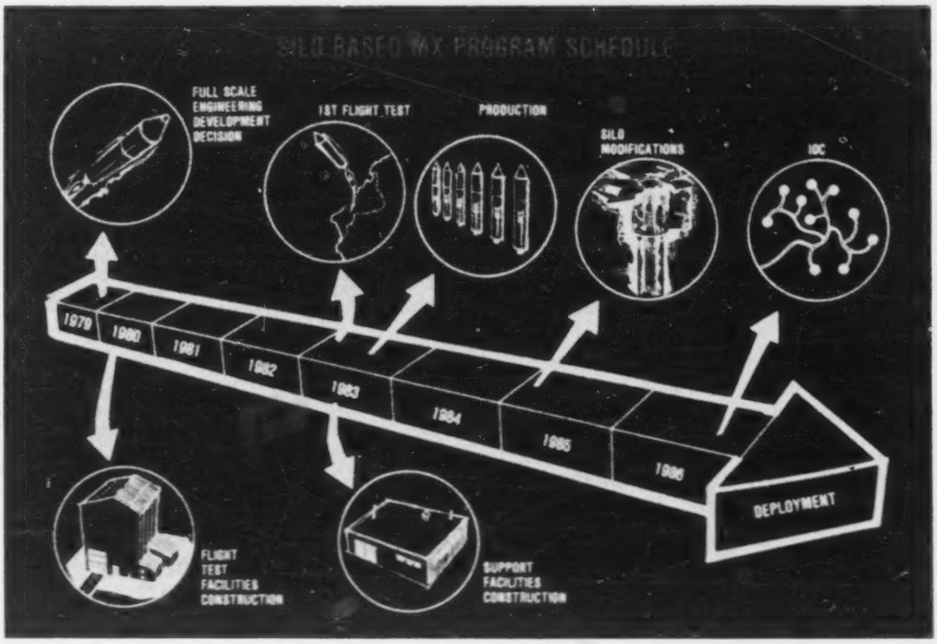
The costs are these: For research and development—nearly $8 billion. The year 1983 is the peak year for that. That number will start to go down in 1984 and beyond.

Procurement begins in 1983. This is another $7 billion for that number of missiles. The construction is at Vandenberg. This is largely done.

Of the $15 billion, almost $4 billion essentially has been spent at this point. So, there is about $11 billion to go to build this.

To look at the basing, it gets a little more complex. The first thing I have done is, from this total of $3.6 billion, which is what we are going to spend, I have taken $700 million that we already have spent for the multiple protective shelter system—not that some of that data won't be usable, but I don't know how to separate it. We have spent that and have set that aside. There is $3.6 billion yet to go. Of that, you can identify, reasonably, about $1 billion that will have to be spent if you did not go silo, but instead went air mobile or anything else.

So, the actual cost of the 40 shelters, I think you could say, is about $2.6 billion, which is a lot of money for 40 shelters. It is $65 million per copy and this is because there are very high startup costs. To build a 41st shelter, it would cost only about $15 million.


SILO BASED MX PROGRAM SCHEDULE
FULL SCALE ENGINEERING DEVELOPMENT DECISION
1ST FLIGHT TEST
PRODUCTION
SILO MODIFICATIONS
IOC
1979
1980
1981
1982
1983
1984
1985
1986
DEPLOYMENT
FLIGHT TEST FACILITIES CONSTRUCTION
SUPPORT FACILITIES CONSTRUCTION

General BURKE. The schedule on which we are working for this interim basing is shown here. We began in 1979. We built the facilities at Vandenberg, and that has all worked out well. We are working for the first flight in less than a year. We will be moving to production in the middle of the year. We need to get started on the support facilities construction. That would be at the selected main base plus the depot and the training installation and so forth.

The actual construction on silos would begin in early 1985, with an initial capability in late 1986, and completion in late 1987.

Let me turn to the longer term survivable solution. As I mentioned, we are looking at these three alternatives and I will say a word about each.

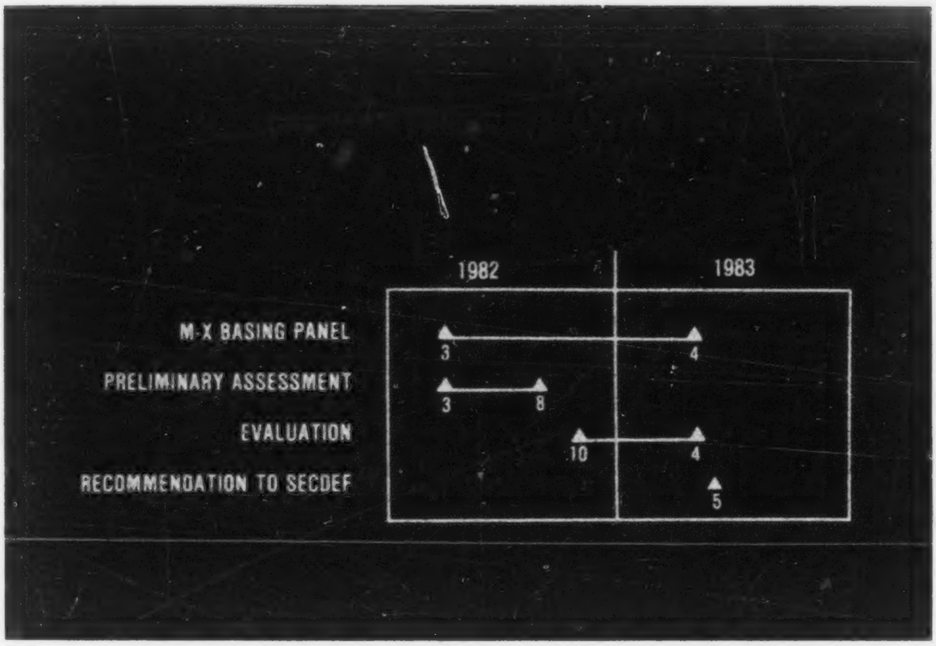
As you know, we have looked at air mobile systems over the years and found them wanting in the past. There is some new technology, which takes us down a new path. That is what we are following now. Those include recent advances in composite materials and highly efficient engines. This means, at least as some people believe, that we might be able to build an airplane that is very fuel efficient and that could stay aloft not for hours, but for days on end. In this case, you could afford to keep airplanes continuously in the air, and they would pick up the same sorts of survivability features as submarines.

Now, all of that has been held in abeyance because of the existing congressional restriction.

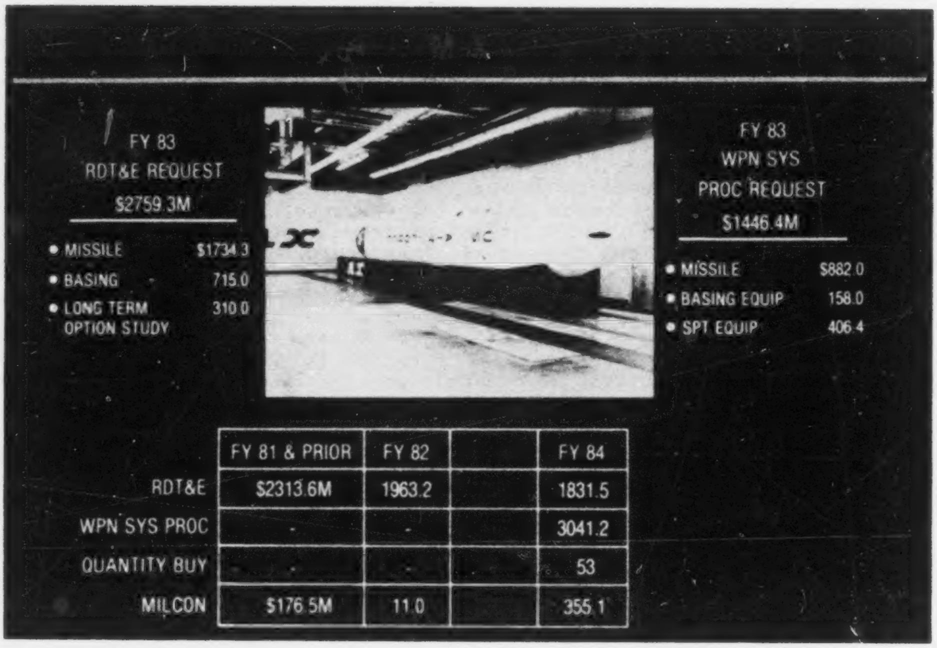
Deep basing also has been looked at over the years. The idea here is that you would provide for the survivability of missiles by putting them 2,000 to 3,000 feet below the surface of the Earth, perhaps also on the south slopes of mountains. There is some new technology here in the mining industry, such as new boring machines and devices, which people think might have the capability to do that. But this is clearly not a quick reaction situation. We thought of it as perhaps part of the secure reserve force primarily.

The third alternative, the one for which General Tate is responsible, is ballistic missile defense. He is working very hard on that down at Huntsville. We, obviously, maintain the closest continuing association with him on that.

In accordance with congressional direction, we are pursuing the deceptive basing as part of the ballistic missile defense.



General **Burke**. The schedule for that decision process is shown here. This month we begin with an MX basing panel review. We are going to break that into two phases. Between now and August, we are going to try to winnow out the best set of alternatives from those three basic approaches and give them a more rigorous evaluation, which we will complete by April 1983, so that the Air Force can make its recommendations to the Secretary of Defense in May. He, in turn, will go to Congress with his recommendations in July.



FY 83
RDT&E REQUEST
$2759.3M

• MISSILE	$1734.3
• BASING	715.0
• LONG TERM OPTION STUDY	310.0

FY 83
WPN SYS
PROC REQUEST
$1446.4M

• MISSILE	$882.0
• BASING EQUIP	158.0
• SPT EQUIP	406.4

	FY 81 & PRIOR	FY 82		FY 84
RDT&E	$2313.6M	1963.2		1831.5
WPN SYS PROC	-	-		3041.2
QUANTITY BUY	-	-		53
MILCON	$176.5M	11.0		355.1

General **Burke**. Finally, the MX request for fiscal 1983 is as shown. It initiates production and procurement of missiles, nine missiles, a very large amount of procurement, nearly $1.5 billion. That is typical of a new program. There is about $900 million in nonrecurring startup costs associated with it.

Thank you, Mr. Chairman.

[The prepared statement of General Burke follows:]

PREPARED STATEMENT OF LT. GEN. KELLY H. BURKE, HEADQUARTERS, U.S. AIR FORCE

Mr. Chairman and Members of the Committee:

Today, the greatest danger we face is clearly the Soviet Union. While there are certainly other threats to American interests, only the Soviets have the capability to directly threaten our survival as a nation. They have amassed this capability through an unprecedented arms buildup which shows no signs of slackening. Because of the limited appeal of their ideology, political structure, and economic system, the Soviets have repeatedly resorted to the threat or actual use of military force to achieve political objectives. The coercion of Poland and invasion of Afghanistan are graphic examples. To the extent they believe themselves militarily superior, the Soviets are more likely to continue to pursue other adventures that otherwise might be considered too risky.

The military capability of a nation or an alliance is largely a function of the resources it spends to achieve that capability. Since 1971, cumulative Soviet military investment (procurement, RDT&E, and military construction) has outpaced U.S. investment by $440 billion (1983 dollars). During the same period, Warsaw Pact military investment exceeded that of the Atlantic Alliance plus Japan by over $100 billion.

This difference in expenditures between the Warsaw Pact and the Atlantic Alliance is magnified by the marked incongruities in political and economic alignments that exist within the two groups of nations. As an example, the Soviets, through their system of design bureaus, provide the bulk of the military designs and equipments to other Warsaw Pact countries. This results in a significant increase in the effectiveness of their investment for military hardware. On the other hand, the investment effectiveness of the Atlantic Alliance and Japan is reduced because of differences in their industrial base and standards, multiple designs, and concomitant smaller production runs.

Although comparisons of military expenditures are useful for illustrating relative trends, it is Soviet hardware and capabilities that form the substantive basis of our concern. The Soviets have and are continuing to outproduce us in almost every category of military equipment. In addition to growing numerical superiority, the Soviets are fielding systems of increasing quality and sophistication. In Soviet airpower, we are seeing fighter aircraft with increased payload and range and with improved avionics, armaments, and electronic countermeasures. These advances not only enhance their offensive capability, but also are eroding the qualitative superiority we have traditionally relied upon to offset the quantitative imbalance.

In sum, the sustained Soviet military buildup has resulted in a major shift of the military balance in the direction of the Soviet Union. Continued Soviet military growth, if left unchecked, will inexorably result in unambiguous Soviet military superiority which, in turn, will create conditions conducive to increasingly overt Soviet moves against our interests around the globe. We cannot afford a perception on the part of the Soviet Union, our allies, or other nations that the United States is neither able nor willing to meet the Soviet challenge.

Our success in meeting this challenge will, to a great extent, depend upon our maintaining a continuing commitment to stronger defense. The Air Force's RDT&E and procurement programs are vital elements within the overall defense program. Through these programs, we will develop and procure the systems needed to redress the imbalance and reverse the erosion of our technological lead. Our Fiscal Year 1983 request is a strong step toward meeting the Soviet challenge.

Additionally, we need improved production efficiency and a strong industrial base to support our defense requirements. To control costs and make effective use of available resources, we are emphasizing programs to upgrade the efficiency of industrial facilities and, at the same time, undertaking important new initiatives to strengthen the management of our programs. We must also continue effective armament cooperation with NATO and other allies to collectively maximize the return on our investment for defense.

This budget continues to reflect emphasis on aircraft spares and repair parts to improve our operational readiness and sustainability. However, this has been balanced with continued production of aircraft and other systems. In addition, this budget supports a strong RDT&E program which will enable us to counter future threats and to correct military deficiencies. In developing the budget, to be consistent with our national security objectives, we have taken care to provide an appropriate balance between near-term and long-term requirements.

STRATEGIC

Strategic force modernization is one of the highest priority efforts contained in the budget request. This emphasis is dictated by the need to end the relative decline in our strategic capabilities and to restore a margin of safety in the U.S.-Soviet strategic balance.

The fundamental objective of our strategic nuclear forces is to deter nuclear attack or the threat of such attack on the United States, our allies or others whose security is vital to our national interests. This objective is supported by the strategic Triad concept: a highly credible, capable, and well-hedged force structure that is designed to deter and, if necessary, respond to a wide range of threats. The Triad consists of submarine-launched ballistic missiles (SLBMs), land-based intercontinental ballistic missiles (ICBMs), and the bomber leg which includes cruise missiles and supporting tankers. These forces must be capable of surviving a first strike with a credible counterstrike capability of such magnitude as to deny the Soviets any possibility of a favorable strategic outcome.

The Triad concept has two major benefits. First, it provides confidence that, while the Soviets may be able to develop the capability to destroy or neutralize one leg of the Triad, they would find the task of simultaneously neutralizing the remaining legs beyond their capabilities. Second, it forces the Soviets to spread their defensive efforts to counter a wider range of threats, thus denying them the advantage of concentrating their resources in any single defense area and/or diverting funds to areas more threatening to us. The Triad has served us well in the past and will continue to serve us well in the future if we act promptly and prudently to redress the emerging vulnerabilities and deficiencies in our strategic forces.

At the end of World War II, the United States had a monopoly in nuclear weapons. This posture allowed us to rely on our strategic force superiority to help maintain stability in the world. Today, however, the Soviets have fielded powerful strategic forces which have caused a shift in the strategic balance. Any imbalance in strategic forces provides an added incentive for Soviet adventurism and makes meaningful and equitable arms reduction agreements difficult to achieve. Unless the Soviet momentum is checked, we face the ominous prospect of substantial Soviet superiority in the years ahead.

This shift in the balance of strategic power has resulted from a determined and sustained commitment to strategic force modernization by Soviet leaders. A significant disparity has existed for years between U.S. and Soviet spending for strategic forces. Since 1971, the estimated cumulative dollar costs of Soviet strategic force procurement exceeded that of the U.S. by about $130 billion (1983 dollars). Our major challenge is to modernize our strategic forces to maintain their deterrent value in the face of this substantial Soviet buildup. In short, we must proceed quickly and resolutely with a vigorous strategic modernization program.

Last October, President Reagan announced a broad and coherent plan for revitalizing our strategic forces. Over the next several years, the President's program will strengthen our current strategic posture, and provide deterrence that is far more secure and stable. Furthermore, the program will increase the incentive for the Soviets to negotiate genuine arms reductions.

The President's program consists of five mutually reinforcing elements: (1) improvements in command, control, and communications (C^3) systems; (2) modernization of strategic bombers; (3) deployment of new submarines and submarine-launched missiles; (4) a step-by-step plan to improve the strength and accuracy of new land-based missiles and to reduce their vulnerability; and (5) improvements in strategic defense. The Air Force is responsible for carrying out much of the President's strategic program. The balance of this chapter describes the key Air Force strategic offense and strategic defense programs. Strategic C^3 systems are discussed in Chapter V.

STRATEGIC OFFENSE

Strategic Offense encompasses the two legs of the strategic Triad for which the Air Force is responsible--land-based ICBMs and the bomber leg.

Land-Based ICBMs

Among the most critical and growing challenges facing us today is improving the capability and survivability of our land-based ICBM forces. The Soviets now have the capability to destroy a large and growing percentage of our land-based ICBMs and still maintain a large residual force of weapons.

The M-X missile is being developed to improve ICBM capability through a phased modernization plan. The plan provides for survivability and endurance of the M-X over the long term, while taking advantage of the M-X's unique capability and flexibility in the near term. Survivability and endurance will be pursued through vigorous research and development on three different basing options: (1) Continuous Patrol Aircraft--a survivable, long-endurance aircraft platform for M-X; (2) Deep Basing--deployment of M-X in survivable locations deep underground; and (3) Ballistic Missile Defense (BMD)--active defense of land-based M-X missiles. Within the BMD option, we will work with the Army to explore the synergism which can be achieved through various combinations of active defense, silo hardening, and deceptive basing.

The Air Force is responsible for the first two options, while the Army, in cooperation with the Air Force, is responsible for BMD. These development efforts are structured to permit selection of one or more of these options by July 1983, as directed by Congress.

To provide improved capability in the near term, we will deploy a minimum of 40 M-X missiles in Minuteman silos. Minuteman silos were selected for four primary reasons: (1) greater operational effectiveness, (2) deployment in one wing, which enhances C^3 capabilities, avoids duplication of facilities, and reduces costs, (3) compatibility with BMD deployment, and (4) flexibility for future expansion. Criteria for silo selection includes geological conditions which provide maximum inherent hardness against nuclear effects and preserves the option for further hardening, should that be a feature of the long-term basing mode.

Deploying M-X in silos is a reasonable and prudent approach for improving the deterrent capability of our ICBM force. Since M-X will be ready for deployment in 1986, placing M-X in existing silos is the fastest way to improve our capability. M-X in silos will also serve as a near-term counterbalance to the growth in Soviet hard-target, counterforce capabilities. Furthermore, the decision to produce and deploy M-X in silos will greatly enhance the U.S. position for favorable strategic arms reduction talks.

In FY 1983, we will continue development of M-X, vigorously pursue the long-term basing options and procure the first nine missiles. These efforts support our objective of deploying M-X in silos beginning in 1986.

Although M-X commands our primary attention, important programs are also underway to improve the effectiveness and endurance of our Minuteman force. We plan to replace 50 Minuteman IIs with Minuteman IIIs at Malmstrom AFB, Montana. This will provide 100 additional Minuteman warheads. In the ICBM C^3 program, we are integrating three improved communications systems into the Minuteman launch control centers to increase reliability of emergency message reception and enhance connectivity with higher authority and other strategic forces. We are also revising the guidance software to improve Minuteman III accuracy.

Modification programs for the Minuteman force include the Minuteman Extended Survivable Power (MESP) program to provide lithium batteries for 200 Minuteman III silos. These batteries will extend Minuteman on-alert time for a prolonged period by augmenting existing commercial and standby diesel power sources. Other modification projects support reliability and maintainability upgrades.

Titan II, our oldest deployed ICBM, has already exceeded its planned operational life and is becoming more costly and difficult to operate and maintain. As part of the President's strategic modernization program, Titan IIs will be incrementally deactivated between FY 1983 and FY 1987. The planned retirement schedule permits a prudent drawdown pace consistent with safety and logistical constraints, while at the same time satisfying operational alert requirements. Requested funds are for necessary modifications to maintain the safety and effectiveness of the Titan II system throughout the planned deactivation period.

The Advanced Strategic Missile Systems program provides long-term options for improving ballistic missile forces by supporting the early development stages for critical elements of advanced reentry systems, missile guidance, support equipment, and basing. Our current emphasis is on developing M-X defense penetration systems which will also be adaptable to Minuteman III.

The Bomber Leg

Historically, the unique military characteristics of the manned bomber have provided a vital dimension of flexibility to our strategic and tactical forces. Bombers are the only element of the Triad that can be launched prior to a decision to employ these weapons. During a crisis, manned bombers can be launched to ensure their survivability or to signal national resolve. As the situation requires, bomber crews can then be redirected or recalled with confidence. Moreover, bombers provide the capability to conduct damage assessment strikes against fixed targets and to engage unanticipated or imprecisely located targets. In addition, through the use of human judgment and on-board sensors, crews can determine target location and status at the time of strike.

The manned bomber is also able to complement our tactical forces by providing the flexibility for nonnuclear force projection in response to unforeseen contingencies worldwide. In addition, bombers are able to provide maritime support to U.S. naval forces through long-range sea surveillance, ship attack, and mine-laying. As reusable strategic weapon systems, long-range combat aircraft can accurately deliver large nuclear or conventional payloads throughout the entire spectrum of conflict.

In light of the rapid advances in the Soviet military arsenal and Soviet and Soviet-backed adventurism around the world, the need to modernize our strategic bomber force is clear and compelling. The B-52s have been the mainstay of our manned bomber forces for the past 25 years, but their ability to continue to serve effectively in the penetration mission is diminishing. They are becoming more difficult and expensive to maintain and, more importantly, will become increasingly vulnerable to a Soviet first strike and to Soviet air defenses over the next several years. Because B-52s are not fully hardened against the effects of nuclear blasts and are relatively slow in flying out from their bases, they are more vulnerable to attacks from SLBMs launched from Soviet submarines patrolling off our coasts. Moreover, because of their large radar reflectivity and relatively slow speed at low altitude, the B-52s will be far less able to penetrate Soviet air defenses during the latter part of this decade.

The limitations inherent in the B-52 make it imperative that we start fielding a replacement aircraft now. We have begun a time-phased bomber modernization program designed to use the remaining capabilities of the B-52, while laying the groundwork for our future bomber force. The plan calls for the major portion of the B-52G/H force to undergo modification for cruise missile carriage. Additionally, we will produce 100 B-1Bs which will have an initial operational capability (IOC) in 1986. The final segment of the plan is to develop and produce an Advanced Technology Bomber (ATB) with an estimated IOC in the early 1990s.

Acquiring the B-1B while continuing to pursue the ATB is the most prudent approach for revitalizing our bomber forces. This approach enables us to field the necessary additional forces required during a period when the United States must depend heavily on bombers, while we take the proper steps to strengthen our land-based missiles. It will also provide time for an orderly and logical development pace of the ATB to capitalize on this important technology and avoid the costly major redesigns likely in a too rapidly paced program. In addition, a combined force of B-1Bs, ATBs, and cruise missiles will place maximum stress on Soviet air defenses and provide the United States with significant leverage in our long-term strategic competition with the Soviets.

The B-1B is about 80 percent common with the original B-1 in terms of basic airframe and engine design. It will incorporate state-of-the-art improvements that will make it highly survivable against existing and projected threats. For example, the B-1B will embody a combination of techniques to reduce its radar cross section to a level one-tenth that of the original B-1 and one-hundredth that of the B-52. It will also include the latest developments in electronic countermeasures technology and offensive avionics systems. These developments, in conjunction with its high speed and low level capabilities, will provide high confidence that the B-1B will be able to penetrate Soviet air defenses well into the 1990s and perform as an effective cruise missile carrier and conventional carrier well into the next century.

We are confident that we can field the B-1B on time and within the projected cost of $20.5 billion (expressed in FY 1981 constant dollars or $29.5 billion, expressed in then year dollars), provided that the funds required are made available in accordance with our schedule. This confidence stems from the fact that the major part of the engineering is complete, the design is mature and tested, and the B-1 has already undergone almost 2,000 hours of highly successful flight testing. The current program incorporates no new technology development. Our primary focus is on the integration of proven technology and state-of-the-art systems. In addition, critical long-lead items necessary for production, such as forgings, tooling, and materials, have been retained from the original B-1 program and are available. Finally, we have in place a highly skilled and experienced team of Air Force and contractor personnel to manage the program.

The FY 1983 B-1B RDT&E program continues necessary development and test activities, including work deferred from the original B-1A program, cost/producibility redesigns, development of multi-role capabilities, and flight tests. The B-1B procurement request provides for the purchase of seven aircraft, initial spares, and procurement for follow-on aircraft.

As for the ATB, we have selected the prime contractor as well as other key members of the development team. We are proceeding with this program at the fastest possible pace. While most details of this program are classified, the essential point is that the ATB is being developed using low observable techniques to negate the effectiveness of present and projected air defenses. The technologies involved are exciting and promising, but because of the major advances required in several areas and the consequent uncertainties involved, there would be a high degree of program risk in concentrating solely on ATB. For these reasons and others, a significiant acceleration of this important program is not prudent at this time. However, we are confident that an orderly development program will enable us to resolve these uncertainties and will result in an ATB that represents a technological advance of extraordinary military significance. When deployed in the 1990s, it will augment the B-1B capability and contribute dramatically to the strength and deterrent value of our strategic forces well into the next century.

Until the B-1B is available, the B-52 will remain the mainstay of the bomber leg. As these aircraft transition to the cruise missile carriage role, we expect them to remain effective well into the 1990s. These continuing capabilities will require modifications and updates to counter the expected threat, maintain aircraft effectiveness and reliability, and keep the aircraft supportable. RDT&E activities include avionics updates to B-52G/Hs for Air Launched Cruise Missile (ALCM) compatibility; updates to selected critical subsystems, including the radar, to correct reliability and supportability problems; and tests and development to provide essential electronic countermeasures and nuclear hardness upgrades.

Our B-52 procurement efforts have been largely devoted to obtaining offensive avionics system modification kits for the B-52G/H and modification kits for a cruise missile carriage capability for the B-52G. In FY 1983, we will also begin procurement of cruise missile carriage modification kits for the B-52H.

Our efforts to keep the B-52, FB-111, ALCM, and tactical aircraft current with the increasingly lethal and sophisticated Soviet air defenses, center on the very important Protective Systems program. This program develops and tests improved electronic, infrared and elecro-optical countermeasures, as well as lethal protective systems.

We are continuing development and procurement of ALCM, the only major near-term initiative we have to counter the growing expansion of Soviet military capabilities. The ALCM enhances our bomber's capabilities by providing greater weapons accuracy, increased flexibility for bomber routing and targeting, reduced bomber exposure to defenses, and defense saturation. Our RDT&E activities include development of depot support equipment, electronic countermeasures to increase survivability, and upgrades to enhance ALCM's effectiveness. The FY 1983 procurement funds are for the purchase of 440 additional missiles.

The near-term deployment concept is to carry a mix of ALCMs, SRAMs, and gravity bombs on those B-52s modified for cruise missile carriage. This will prevent the Soviets from optimizing their defense against the bomber or the cruise missile, and will provide maximum deliverable megatonnage and weapons during the period the B-52 transitions to a stand-off, cruise missile carrier role.

In reviewing the internal weapons carriage on current and planned bomber forces, we recognized an opportunity to consolidate several rotary launcher development efforts into one Common Strategic Rotary Launcher (CSRL). Currently, there are separate launcher designs for the B-52, B-1B, and ATB for the carriage of nuclear bombs, SRAM, and ALCM. The opportunity exists for the development of a single launcher to accommodate these weapons. Further, it is desirable for all new rotary launchers to be compatible with future conventional weapons--for example the Medium Range Air-to-Surface Missile (MRASM) and the Conventional Standoff Weapon (CSW). To avoid proliferation and to reap the cost, operational, and support benefits associated with a common design, we are proceeding with initial activities that we anticipate will lead to the development of a CSRL. The CSRL is intended for employment on all three bombers.

Tanker aircraft are a vital part our bomber and conventional forces. In the KC-135 program, the major effort is to replace the current engines with CFM56 modern technology engines. We are continuing structural modifications, including the wing reskin program, and are correcting deficiencies in the refueling subsystems to enhance air refueling operations.

Reengining with CFM56 is the most cost-effective means of alleviating a serious and growing tanker shortfall. A reengined KC-135, designated the KC-135R, is on the average as capable as one and one-half KC-135As and will have a useful life well into the next century. Aside from increased tanker requirements, the KC-135R will also correct specific KC-135A operational and environmental deficiencies. With its performance improvements, the KC-135R will offload more fuel and provide increased operational flexibility by eliminating our current dependence on extremely long runways.

In addition, the new engines will offset the high and growing costs of operating and maintaining the present aging engines. Due to fuel efficiency alone, we estimate that a fleet of KC-135Rs would save approximately 110 million gallons of fuel per year, a five year savings of over $715 million. Finally, the KC-135R will meet Federal Aviation Administration noise and pollution standards which the current engines miss by a wide margin.

STRATEGIC DEFENSE

Strategic defense is an integral part of our strategy of deterrence. It is intended to provide timely, reliable, unambiguous warning and assessment of an enemy missile or bomber attack, defend against bomber and cruise missile strikes, and support our space surveillance and defense activities.

Atmospheric Warning and Defense

Over the past twenty years, the United States has significantly reduced forces assigned to atmospheric defense. On the other hand, the Soviet threat has increased in numbers and capability with the introduction of the BACKFIRE bomber and improved air-to-surface missiles. Given this growing threat, atmospheric surveillance and warning are required to support intercept operations and assure that retaliatory responses can be made. Competent atmospheric defenses are necessary to preclude U.S. vulnerability to a precursor bomber attack and to limit the damage that would be inflicted in follow-on bomber strikes. Our current atmospheric warning and defense systems have serious deficiencies which must be corrected.

Atmospheric defense of North America is a cooperative U.S.-Canadian effort. The atmospheric surveillance and warning system is configured to control access to North American airspace. It is composed of ground-based radars in the Distant Early Warning (DEW) Line, the CADIN-Pinetree system in southern Canada, and the Joint Surveillance System. During periods of crisis, surveillance and command and control of interceptor aircraft will be provided by the E-3A Airborne Warning and Control System (AWACS) aircraft. Interceptors currently assigned for atmospheric defense include F-106s, F-4s, and F-15s.

The Air Force has developed a master plan for tactical warning, attack characterization, and air defense and control which has largely been adopted by the Department of Defense. The first major initiative is to modernize our surveillance and warning system through development and deployment of two Over-the-Horizon (OTH) radars and an improved DEW Line.

The OTH radar will correct coverage deficiencies by providing wide-area, long-range, and all altitude warning of atmospheric attack from the East and West. Because of performance degradations from aurora effects, the OTH radar is not completely suitable as a North-looking surveillance and warning system. Therefore, we will improve the existing DEW Line radars with a mix of minimally attended long-range radars and short-range gap-filler radars. In the future, we intend to recommend deployment of a South-looking OTH radar to complete North American surveillance coverage.

Other significant improvements include additional F-15 and E-3A AWACS procurements. With its long-range radar and look-down, shoot-down capability, the F-15 will substantially improve our air interceptor force. The Air Force plans to eventually convert five active F-106 squadrons to F-15s. The E-3A is essential to ensure survivable surveillance and to meet command and control requirements. These procurements, coupled with improvements under development, will greatly enhance our atmospheric warning and defense capabilities.

Missile Surveillance and Warning

The credibility of our national defense policy of nuclear deterrence and escalation control are critically dependent on our ability to provide unambiguous, timely, reliable, survivable, and enduring warning and assessment of an enemy missile attack.

Ballistic missile attack warning and assessment are currently accomplished by space satellite systems, three Ballistic Missile Early Warning System (BMEWS) sites, the Perimeter Acquisition Radar Attack Characterization System radar, two PAVE PAWS SLBM detection and warning sites on East and West coasts, and the FPS-85 and FSS-7 SLBM radars in Florida.

One of our objectives for improving the capabilities of our current systems is to improve the resolution to go beyond providing simple attack warning. We want to be able to determine what kind of attack is in progress so that our selected response is appropriate. To achieve better attack assessment, we are developing the capability for more precise tracking and improved data processing to provide better preimpact and transattack assessment. This objective, as well as improved reliability and supportability, is supported by the BMEWS modernization program. A transattack and postattack assessment capability will be provided when the Integrated Operational Nuclear Detonations Detection System (IONDS) becomes operational. IONDS payloads will be carried on Navstar Global Positioning satellites.

In response to the growing Soviet SLBM threat, we are working to expand our SLBM warning system by deploying two additional PAVE PAWS radars in the southeastern and southwestern United States. These deployments will expand our coverage and enable us to phase out the older, less capable SLBM radars in Florida. We are also developing upgrades for all four PAVE PAWS radars which will provide improved warning and attack assessment.

We are continuing to pursue technology to support an advanced missile surveillance system for improved space-based attack assessment. Infrared data on earth background and ballistic missile signatures are being collected and analyzed in the Missile Surveillance Technology program. This effort supports development of the required technologies and design being conducted in the Advanced Warning System program.

Finally, we have a new program called Ballistic Missile Tactical Warning/Attack Assessment Support. This development program will develop the overall architecture for current and proposed systems to ensure that individual warning and attack assessment elements operate coherently as an integrated system.

Space Surveillance and Defense

Our space surveillance and defense program consists of four elements.

The first element focuses on improving our ability to monitor space activities. Surveillance is the key to our warning and defensive options, and in our SPACETRACK program, we are pursuing several near-term efforts to upgrade our surveillance capability. For the far term, the primary thrust of the Space Surveillance Technology program is to develop a spacebased surveillance system which will reduce or eliminate overseas basing, improve our coverage of objects and events in space, provide warning and verification of attacks on our satellites, and provide targeting and strike assessment for our own antisatellite program.

The second element is to make our satellites less vulnerable to attack. Demonstrated Soviet antisatellite capabilities and their potential to intervene electronically require that we take prudent steps to defend our satellites. In the Satellite Systems Survivability program, we are developing technology and procedures which will increase the survivability of our satellites and their communication links and ground stations.

In the third element, the Space Defense Systems program is continuing the development of our own operational antisatellite capability to deter Soviet ASAT use and, if necessary, enable us to destroy hostile space systems that threaten our forces.

The fourth element provides the vital command, control, and communications to effectively integrate, coordinate, and manage all space defense resources. The North American Aerospace Defense Command Combat Operations Center program will develop the Space Defense Command and Control System in a phased approach to support the evolving space defense elements.

Other Strategic Defense

The Defense Support Program is a key element of our Nation's strategic defensive posture. This program provides data to the National Command Authorities, North American Aerospace Defense Command, and Strategic Air Command. Our development efforts are aimed at increasing the survivability of operational data through the development and deployment of truck-mounted Mobile Ground Terminals, improving the performance and life expectancy of follow-on satellites, and ensuring that follow-on satellites are compatible with the Space Shuttle. To maintain the operational capability of this vital system, new satellites must be procured to replace those that have failed, worn out, or are unable to meet the growing threat. To meet near-term requirements, four more DSP satellites are being procured, two in FY 1983 and two in FY 1984.

The Space Laser program has been initiated in accordance with Congressional direction to determine the utility and feasibility of space laser weapon systems. We recognize the need to have a much sounder base of research and advanced technology in this area before weapons development decisions can be made, and we are directing our efforts toward that end.

COMMAND, CONTROL, AND COMMUNICATIONS

Command, control, and communications (C^3) systems are essential to implement strategy, control forces, and employ weapons in modern warfare. These systems support day-to-day operations, provide time-critical warning information to decision makers, facilitate accurate situation monitoring and allocation of resources in crisis situations, and permit the appropriate and effective employment of military power in wartime. Recognizing our dependence on C^3, the Soviets place heavy emphasis in their doctrine on the disruption of C^3. The threats include both physical and electronic attacks.

In response to this growing threat, our primary objective is to increase the survivability, security, and jam-resistance of our C^3 links. Another objective is to improve both the reliability and interoperability of our systems. Finally, we want to exploit new technologies to more effectively meet future threats and satisfy our C^3 requirements.

STRATEGIC C^3

Our strategic C^3 programs include warning and assessment systems, command centers, and supporting communications systems. Since the warning and assessment systems were discussed in the Strategic Defense section on Chapter II, this section will concentrate only on command centers and communications.

One of the key features of the President's strategic program is the modernization of strategic C^3. For deterrence to be a successful strategy, we need effective strategic C^3 systems to support the employment of our nuclear forces. In the past, we have not modernized our C^3 systems fast enough. As a result, these systems have insufficient survivability and reliability to operate reliably over an extended period following a Soviet attack. Consequently, we are increasing the survivability and endurance of our strategic C^3 systems. Our objective is to make these systems as strong as the forces they support.

A primary program for command and control of our strategic forces is the Air Force Satellite Communications (AFSATCOM) System. The AFSATCOM system consists of aircraft terminals, ground terminals, and communications packages on several satellites, including the Fleet Satellite Communications (FLTSATCOM) System, Satellite Data System (SDS), and classified host spacecraft. In our AFSATCOM RDT&E program, we will develop improved terminals and super high frequency (SHF) communications equipment which will be carried on the Defense Satellite Communications System (DSCS) III spacecraft and installed in missile launch control facilities. These RDT&E initiatives will provide more resistance to jamming and nuclear weapon effects.

We are installing AFSATCOM terminals in strategic bombers, reconnaissance and surveillance aircraft, ground and airborne command centers, and missile launch control facilities. The Army and Navy are also acquiring terminals. For FY 1983, we are requesting procurement funds for an AFSATCOM communications package to be integrated on host spacecraft to ensure continuity of communications in critical geographic areas.

SDS is a major part of the AFSATCOM system and provides critical two-way transpolar command and control communications for our nuclear capable forces. SDS also supports a data communications network among remote tracking stations and the Satellite Test Center for command and control of our satellites. The FY 1983 RDT&E program completes development of a Shuttle-compatible spacecraft and the procurement program sustains the capability to launch satellites to replenish the orbital constellation.

For the future, we are developing a new satellite communications system called MILSTAR to replace FLTSATCOM and SDS to fulfill the urgent need for highly jam-resistant and survivable satellite communications. MILSTAR will feature increased jam-resistance through the use of extremely high frequency (EHF) communications and increased survivability through a variety of techniques. It is a joint Army, Navy, Air Force program which will support both strategic and tactical users.

The E-4 and EC-135 aircraft are survivable extensions of the fixed command centers and provides higher confidence in our ability to manage strategic forces during a nuclear war. We are developing several improvements to these airborne command posts: SHF and ultra high frequency (UHF) satellite communications terminals, a high-powered very low and low frequency (VLF/LF) terminal, improved communications processing, electromagnetic pulse (EMP) testing, and integration of terminals for on-board processing of IONDS data. These systems have anti-jam features and will support operations in a nuclear environment over extended ranges.

Our FY 1983 aircraft modification program includes procurement funds for installing automatic data processing equipment to improve the E-4B battle staff's ability to provide critical and time sensitive information to the National Command Authorities. Procurement funds are also requested to harden the EC-135 against nuclear effects.

Other strategic C^3 programs are Strategic Air Command (SAC) Communications and Minimum Essential Emergency Communications Network (MEECN). Under the SAC Communications program, we are developing the SAC Digital Network (SACDIN). SACDIN modernizes SAC's existing hard copy C^3 system, which is aging and has insufficient capacity. SACDIN objectives are to provide responsive, two-way, secure command and control information between SAC Headquarters and subordinate commanders. The system, in addition to providing greater survivability, will also feature increased flexibility and growth capacity.

The MEECN program contains three key projects: VLF/LF Improvements, Adaptive High Frequency/Very High Frequency (HF/VHF), and the CONUS Groundwave Network. VLF/LF Improvements provide for improved dissemination of war orders via the secure VLF/LF system and the development of a small VLF/LF receiver for bomber aircraft. Adaptive HF/VHF will provide a modular family of radios which will improve the reliability of two-way communications in a nuclear or jamming environment. The CONUS Groundwave Network project develops a grid of unmanned, EMP hardened, jam-resistant relay communications nodes which will be collocated with existing commercial broadcast towers where feasible.

TACTICAL C^3

Our existing tactical C^3 systems also have a number of critical deficiencies which require correction. Chief among these is their susceptibility to enemy jamming. Accordingly, we are taking action to add jam-resistance to our existing tactical voice communications network. We are now implementing the HAVE QUICK modification to provide a near-term jam-resistant voice capability for our existing UHF radios. At the same time, we are using more advanced technology to develop an improved system, SEEK TALK, that will provide the jam-resistance necessary to respond to the projected mid-to-late 1980s jamming threat.

In addition to jamming susceptibility, other major deficiencies of existing tactical C^3 systems include delays in passing time-critical information through communication system nodes and the lack of common reference points to coordinate the tactical air battle. Although much combat information is suited to voice communications, aircraft controllers and voice links can become saturated when voice is relied upon as the sole means of real-time communications. Studies show that certain elements of data are passed more efficiently over digital data links. The Joint Tactical Information Distribution System (JTIDS) will correct these deficiencies. JTIDS provides jam-resistant, secure communications between force elements using a digital data link which allows command and control systems to share and exchange more information. Also, each JTIDS terminal can compute its position relative to other terminals, thus providing location and identification of all participating platforms in a common reference grid, as well as an on-board navigation capability.

The tactical communications resources which support the Tactical Air Forces are old and lack adequate capacity to support traffic handling needs. To provide the minimum essential command, control, and communications to support deployed tactical forces, major improvements are needed for the equipment assigned to Air Force Combat Communications and Tactical Air Control System units. In support of this need, we are working with the Army to develop secure, jam-resistant, digital communications equipment through the Joint Tactical Communications Program (TRI-TAC).

The E-3A aircraft provides mobile, survivable and jam-resistant wide area radar surveillance, along with highly sophisticated data processing, data relay, and secure communications capabilities. We are currently producing a U.S./NATO standard configuration E-3A, which integrates JTIDS, a maritime capable radar, and a larger computer into the basic core E-3A. Additional improvements are needed to maintain E-3A effectiveness and to correct deficiencies revealed by operational experience. Improvements underway or planned include development of additional situation display consoles and radios, a command console, and electronic counter-countermeasures to ensure continued effectiveness in the projected threat environment.

Our FY 1983 procurement request provides for the purchase of two E-3As and long lead for one aircraft. In addition, we are contributing to the NATO Airborne Early Warning program which calls for the purchase of 18 E-3As. This program will provide additional capability for the defense of NATO, while at the same time improve Alliance standardization and interoperability.

DEFENSE-WIDE C^3

Major programs in Defense-Wide C^3 include DSCS, Communications Security (COMSEC) equipment, and Advanced Space Communications. DSCS is a maturing, evolutionary DOD system developed to provide SHF satellite communications for secure voice and high data rate transmissions. DSCS provides unique and vital national security communications for worldwide military command and control, crisis management, intelligence and early warning data relay, treaty monitoring and surveillance information, and Presidential and diplomatic traffic.

Our remaining DSCS RDT&E task is to develop DSCS III satellites. DSCS III will provide increased capacity, flexibility, and electronic counter-countermeasure capability. In support of strategic forces, they will also include a UHF/SHF capability for emergency war order dissemination and force execution. The DSCS procurement program provides for replacing DSCS II satellites with DSCS III. Two DSCS III satellites will be procured in FY 1983.

The COMSEC program prevents enemy exploitation of the communications relayed through spacecraft. Anti-jamming and authentication devices are being developed and procured to prevent an enemy from interfering with the control of our spacecraft. In addition, COMSEC devices provide protection for telemetry data during weapons testing.

The concepts, techniques, and advanced technologies for military satellite communications systems capable of surviving in the intense electromagnetic jamming environments expected in the future are developed in the Advanced Space Communications program. Our development activities include efforts in laser communications and in advanced airborne terminal and satellite technologies required for jam-resistant operations. Several of these projects develop selected technologies needed for MILSTAR and DSCS III.

Senator **Warner**. Thank you very much, General.

Ms. Hoeber, we are pleased to accept your statement.

STATEMENT OF AMORETTA HOEBER, PRINCIPAL DEPUTY ASSISTANT SECRETARY OF THE ARMY (RESEARCH, DEVELOPMENT, AND ACQUISITION)

Ms. **Hoeber**. Mr. Chairman, I have a classified statement to submit for the record later, but I would like to give you a few summary remarks for this open session.

First, as General Burke indicated, ballistic missile defense is being considered as one of the alternatives for the future of our strategic posture. This consideration is a national obligation, and the Army is viewing it very seriously. We view our job as making BMD a fully available potential component of the strategic posture.

We are committed to insuring that a greater amount of realistic attention is paid to ballistic missile defense than has been paid by either the Army or the country in the last decade.

Based on the October 2, 1981, strategic modernization program decision, we are asking for more resources to put into the ballistic missile defense program. But, in addition to resources, we are giving it considerable focus and some major amount of redirection about which you will hear later today.

The major thrust is to develop an adequate assessment of the BMD options for increasing the survivability of the U.S. strategic forces.

Intensive Army management and attention to this program direction are being provided at the highest levels, both within the military component and within the secretariat.

General Tate, our ballistic missile defense program manager now will give some details.

Senator **Warner**. General Tate.

General **Tate**. Mr. Chairman, I have a prepared, classified statement for the record.

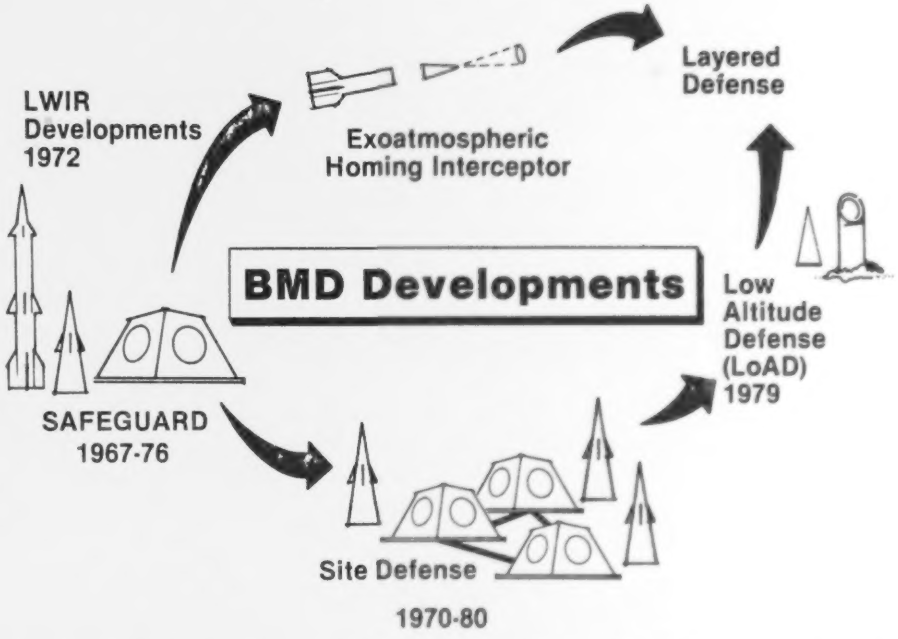
Senator **Warner**. We will be going into executive session very briefly. But it is the Chairman's desire, as well as that of members of the committee, that we do as much of the strategic program in the open as possible so as to acquaint the public.

General **Tate**. Very well, sir. Then I would like to provide a short briefing, if I may.

Senator **Warner**. Would you, please.

STATEMENT OF MAJ. GEN. GRAYSON D. TATE, USA, PROGRAM MANAGER, BALLISTIC MISSILE DEFENSE PROGRAM

General **Tate**. I have some slides which I will show the committee for elaboration, Mr. Chairman.



General TATE. By way of a short history, Mr. Chairman, you will recall, back in the 1960 time period, we had a very vigorous research and development program, called the Nike-X development program, which eventually led to the deployment of a safeguard system in 1975. That was the one site that was allowed the United States, under the provisions of the ABM Treaty, which we signed with the Soviet Union in 1972. That system involved large phased array radars, a large missile which was used for exoatmospheric defense, that is, defense out in the atmosphere, several hundred miles in altitude, and a small missile called the Sprint missile, which was used for low-altitude defense, generally under altitudes of 50,000 feet. That site was only operational for a short time.

In the meantime, we had begun, in 1971, the research and development of a system called site defense, or hard site defense, which was specifically designed to give a level of protection to the Minuteman. That system involved netting several radars together, as many as six or seven, in one Minuteman wing. It used an upgraded version of this Sprint missile, which was part of the safeguard system.

Both of these missiles, of course, used nuclear warheads, as did the missile that was planned for this site defense system.

The money to continue with the prototype development of site defense was discontinued by the Congress in the 1974–75 time period. But, we did go ahead and build one radar at Kwajalein Missile Range, with a single face on that radar, rather than the four as indicated in the picture. We did test that radar and its associated data processing system over a period of about 3 years against a large number of ICBM's fired into Kwajalein from Vandenberg Air Force Base in California.

That was an extremely successful program. It allowed us to validate a lot of the technology which was either poorly understood or not as well developed as we would have liked at the time the one safeguard site was deployed in 1975.

We learned a great deal from that site defense program. It was completed in September, 1980.

All of this technology from Safeguard and site defense is being applied now to the low altitude defense program, which is the current version of our terminal defense, which I will describe in somewhat more detail during the closed session.

That program was approved by the Secretary of Defense in December, 1979. So, we have had it underway almost 2½ years for the definition of the system concept and the subsystems.

In the meantime, in the exoatmospheric area, rather than use this very large missile and a radar, we have been working for about 10 years on technology of another sort.

This new technology uses long wave infrared optical devices and long-range interceptors which can do their intercept without the use of nuclear warheads. That work has come along quite nicely in recent years. A combination of the low-altitude and high-altitude defense into a layered defense concept really makes a very capable system.

General TATE. In December 1979, the Secretary of Defense approved the R. & D. program for the low-altitude defense system, and we began what was called a generic development program. This was for the development of a preprototype demonstration model. It involved the development of a very capable, small interceptor with a nuclear warhead, a small radar, using frequencies that would allow it to be fairly small in size. We also use the latest in data processing capabilities, called distributed data processor, which allows us to pack a lot of data processing capability into a small, lightweight package that uses very little power.

We have been proceeding on this program now for almost 2½ years.

The original concept for that, as I mentioned, was a generic development program to develop those three components—the radar, the data processor, and the interceptor—so that it could be packaged in ways to defend different kinds of targets.

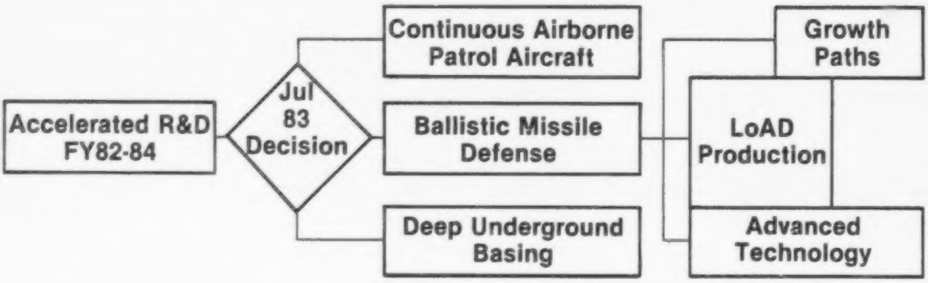
The ones, of course, of most interest, were the defense of MX under the multiple protective shelters mode and the defense of fixed silos, such as those in which we have our deployed Minuteman today.

So, we did pursue work in packaging those components to do either of these two jobs.

It also could have been used as the underlay for a layered defense system together with the exoatmospheric components that I mentioned on the previous slide. It was this kind of system that we have been developing generally for the last 2 years.

BMD

BMD Under The Reagan Strategic Program



Accelerated R&D FY82-84

Jul 83 Decision

Continuous Airborne Patrol Aircraft

Ballistic Missile Defense

Deep Underground Basing

Growth Paths

LoAD Production

Advanced Technology

"Any Ground-Based Scheme Ultimately Would Require A Ballistic Missile Defense For Survivability"

General TATE. With the President's decision in October of last year, we are in somewhat of a different situation now. We are in an accelerated research and development mode by this low-altitude defense technology, leading to a decision for the President in the summer of 1983 for one of these options. General Burke mentioned earlier the long-term basing of MX.

If ballistic missile defense should be chosen as one of the options to be continued in July 1983, we would anticipate going into an intensified full-scale development a year or so later, and, eventually, possibly to the deployment of this system, while continuing with our advanced technology base, our advanced technology program, so that we can develop the technology to give the system the capability to grow if the threat should get tougher.

Those are all of the slides that I had planned to cover in the open session, sir.

Mr. GAFFNEY. Senator Exon, I think it was the chairman's intention that you begin with questioning, if you are prepared to do so.

Senator EXON. Thank you very much, General.

Mr. Secretary, General Burke, I would like to go back to the beginning, on the MX missile deployment.

I am sure that it is perhaps not as comfortable as it should be for you to respond to the questions that I am about to ask, because I assume that the answer will be well, the decision already has been made. But, there have been few decisions that have been made, even by the Supreme Commander, that have not been subject to some degree of reversal over a period of years.

I will start out by asking you first, General Burke, this question. Were you consulted, and if so, in what detail, with regard to the elimination of the MPS basing-mode system in the western desert areas of the United States?

General BURKE. Yes, sir. I had a great deal of opportunity to talk to my OSD counterpart, Dick DeLauer. I would say, I had an unlimited invitation to discuss it with him and, at least on one occasion, personally with the Secretary of Defense.

I did not feel I was denied the opportunity to put my view in. Obviously, I was not very persuasive.

Senator EXON. Can you tell us what you told them or what was your recommendation at that time?

General BURKE. My recommendation, and that of the Department of the Air Force, was that we continue with the multiple protective shelter system on which we were embarked up until that time.

Senator EXON. Can you tell us what Mr. DeLauer's and the Secretary's reasons were for not going ahead with what all of the military experts, up until that time, had advised both the former President and this President to do with regard to the MPS basing mode for the MX?

General BURKE. Their major concern, as expressed to me, Senator, was that the Soviets would have both the opportunity and the wherewithal to continue to build warheads that would overwhelm that system.

Senator EXON. Did you then agree or do you agree with that now?

General BURKE. No, sir. I had a different perspective, which was, one, if we showed the Russians from the beginning that we had not only the capability but the will to maintain the requisite level of survivability, they would find that not an attractive pursuit; and, two, I think, while I would prefer not to talk about survivability in absolute terms, the way I always have preferred to look at the strategic equation is what is needed for the country is, first, to have in the starting position at least a rough balance of forces, and second, that those forces need to be postured in a way that a potential enemy could see no advantage to attacking all or part of them. This means, although he might perhaps attack one element and destroy it, in so doing he would consume a great deal more of his force than he was able to destroy, so that, too, should be a deterrence because he would be falling behind in the balance.

Senator EXON. Thank you, General Burke. I have one more followup question, and possibly will have some others.

When the MX system was originally envisioned, you were around and pretty active, weren't you?

General BURKE. Yes, sir.

Senator EXON. Was it not true that it was generally assumed during the incubation period of the MX that, if it were to be worth its cost, it would have to be deployed in some kind of mobile or deceptive basing system to give it some means of survivability as opposed to what we perceive to be an ever-increasing threat to the "sitting duck" holes in both the Titan and Minuteman areas that we have now?

General BURKE. Yes, sir. In my mind, survivability was the primary objective of the MX program, and I think it still should be.

Senator EXON. The MX program, then, was never originally designed, even in its initial planning, to be located in a fixed location without any type of deceptive basing?

General BURKE. We talked about that a little around about 1975 or 1976, at which time the Soviet warhead numbers and accuracies were projections some distance off. That became less and less attractive as those projections became real and were no longer just projections.

Senator Exon. General, I thank you.

You have a great rapport and a great respect in this committee, and I always have appreciated the most direct answers from any of the military people that I have ever had appear before the various committees. I appreciate your candor very much. I know it is very difficult for you to answer some of these questions. But, let me try one more on you. [General laughter.]

If you were summoned to 1600 Pennsylvania Avenue this afternoon by the Commander in Chief and were asked in your best judgment what would be the best way for us to proceed on deployment of the MX missile, notwithstanding any of the previous decisions, what would you say?

General Burke. Well, I would say, from a military and technical point of view, MPS of some form. I think people make too much of the engineering details.

To me, the essence of MPS is simply that you put a relatively small number of missiles into a relatively large number of shelters in such a manner that, while any shelter can be attacked, in so doing an attacker would incur a very unfavorable exchange ratio. As long as those principles are preserved, I never thought it terribly important whether they were vertical or horizontal, or whether they moved on railroads or ordinary road.

Senator Exon. Just so they could be deceptive in some fashion?

General Burke. Yes, sir.

Senator Exon. Thank you, General.

I want to follow up now with a story that appeared, I believe, in the Los Angeles Times over the weekend by Mr. Robert C. Toth. It indicated that the Warren Air Force Base had, indeed, been selected as the location. I had been assured as late as last Friday, by none other than the Commander of SAC and others, that that decision had not been finally made. But certainly it has been no secret for weeks, if not for months, that the Warren Air Force Base was a prime suspect for placing our new 10-warhead Minuteman in fixed silos. Is that an accurate statement?

General Burke. Your understanding is exactly right.

General McCarthy, on my right, has the responsibility for putting that recommendation together and bringing it to me. I, in turn, take it to Gen. Lew Allen and Secretary Orr, and we expect to take it to Secretary Weinberger about a week from now. That has not been done yet.

I think it is common knowledge, and we certainly acknowledge that one of the key factors is local geology, because local geology largely determines the ultimate hardness of shelters. The geology at Warren looks to be the best.

There are some other things that have to be thought about, such as Grand Forks, and ABM situations certainly are factors.

A decision, however, has not yet been made. It may come out the way Mr. Toth called it, but that is just a prediction.

Senator Exon. General, I understand from other people who have talked to you that you indicate this is not accurate, but this particular story says that not only have you made the decision to base this in the Warren Air Force Base area, but, in addition, the Defense Department—and I will quote—"is expected to order construction of as many as 14 additional silos around each silo holding an MX missile in order to hide or deceptively base the weapon, Pentagon official said."

Can you comment on that?

General **BURKE**. All I can say is this is totally speculative. There is no such decision.

As I showed on the chart earlier, we begin this month to examine these questions, working toward making a recommendation in the spring of next year. We have not yet had our first meeting, so Mr. Toth is way out ahead of the Government on that.

Senator **EXON**. I am told that my time is up. I have a lot more questions, but I will await my second round.

Senator **WARNER**. Thank you. I will defer my questions, except for one, so that Senator Hart may speak. The chairman intends to remain throughout the afternoon and wants to accommodate the other members of the subcommittee.

In your hypothetical meeting, General, at 1600 Pennsylvania Avenue, at which time you said you would indicate the MPS as the system that you regarded as your choice at this time—if I understood you correctly—that would be subject to any further developments, research, that is, R. & D., that would take place here in the ensuing year?

General **BURKE**. Yes, sir.

Senator **WARNER**. It may well be that in the ensuing year we could develop a system which, in your professional judgment, would be superior to just the MPS concept as we have come to know it here in the last 3 years.

General **BURKE**. That is a possibility, sir. Yes.

Senator **WARNER**. Thank you.

Senator Hart.

Senator **HART**. Mr. Chairman, thank you very much.

General, I would like to pick up where Senator Exon left off, if I may, to clarify where things stand now.

You say that Warren Air Force Base is a candidate. It is one of how many?

General **BURKE**. There are six Minuteman bases, and we have not yet ruled out any.

Senator **HART**. One of those will end up being, so far as you know, the location for the first wave of MX's, is that correct?

General **BURKE**. The proposal is to deploy at least 40 MX's in one of those Minuteman fields. There is no plan at this time to go beyond that, although all that could get tied up in the long-term survivable basing system.

Senator **HART**. I believe you said that that decision would be made in the next week?

General **BURKE**. Yes, sir. We should be able to make an Air Force recommendation to the Secretary of Defense in about a week to select one of the six Minuteman main bases.

Senator **HART**. This is addressed to any witness who wishes to respond.

When would you expect that decision to be publicized?

General **Burke**. I would hope very quickly thereafter. I think it is best not to let those things languish after they are addressed. They tend not to remain secret for very long anyway. We are on record as stating that a decision will be made in the spring of 1983.

Senator **Hart**. We are all aware of the arguments against silo basing for the MX, particularly the vulnerability arguments. I understand one of the options, if we are headed in the direction of silo basing, is the possibility of construction of a number of artificial, or so-called "dummy" silos around the actual silo to disguise the missile.

Is that option under consideration?

General **Burke**. Yes, sir. It would be, in connection with the ballistic missile defense. As directed by Congress, we are to look at deceptive basing, which has the potential of providing a lot of leverage to a ballistic missile defense in that you wind up defending only preferentially and not all of them. So, this seems to be a happy marriage between deceptive basing—that is, one missile in several potential shelters—combined with ballistic missile defense. That seems to work better than defending a silo in which there is a known missile.

Senator **Hart**. Does one make sense without the other—just one of those two—or must they go in tandem?

General **Burke**. The MPS, as it was being viewed a year ago, did not hold that ballistic missile defense was mandatory.

Senator **Hart**. No—I mean the silo basing.

General **Burke**. I don't think there is any proposal right now to look at any form of deceptive basing that is not associated with ballistic missile defense.

Senator **Hart**. Let me clarify my question.

If you have BMD, do you also have to have the dummy silo idea?

General **Burke**. No, not necessarily, but it tends to provide leverage.

The trick in the business is to try to get into a position where there is an action-reaction process that takes place. You want to look very carefully so as not to get into a position where your action is countered by a much less expensive reaction on the part of the Soviet Union.

If I might talk in hypothetical terms, you might, for instance, design a successful interceptor that would work, which you could build for $5 million, and it would successfully defend a silo. That could then be countered by the Soviets adding another warhead, which perhaps they could do for $1 million. That would be the wrong way to get into an arms race.

If, on the other hand, you put 15 shelters out there, for example, with the one MX and you preferentially defended only the one that was loaded, you would spend the $5 million, but the Soviets would have to counter that with $15 million. Then you have the right balance.

That is the very general attraction, simple arithmetic. When you get down to working out the technical details, it will not be that simple.

Senator **Hart**. General, is the MPS option dead?

General **Burke**. I would say MPS, as it was known prior to October 1, that is, 4,600 horizontal shelters in Nevada and Utah, and 200 missiles, is dead.

Senator **Hart**. Well, I guess the question that arises for those of us in Wyoming, Nebraska, and Colorado is this. If the people in Nevada and Utah did not want MX, why should we, particularly if it is going to be protected by a BMD system, the nuclear impact of which I don't think anybody knows?

If those States were concerned about becoming a nuclear sponge, I don't think my State or the surrounding States are any more anxious to become a sponge either. I, for one, have never been much of an advocate of the ABM or the BMD option. My own view is pretty much what I think has been yours and the Air Force's all along, and that is that the system does not make a whole lot of sense outside the MPS option.

I think, frankly, what we are headed for is perhaps some sort of rerun of the problems we got ourselves into in Nevada and Utah. I don't think that system was rejected on its merits. I think it was rejected for pretty obvious political reasons.

I, for one, would hate to have the politics of the issue shifted from one region to another just because one region happened to prevail politically.

If the Soviets could saturate the MPS system, they sure can saturate the silo system at Warren Air Force Base, or any other silo system.

I have one final question.

Given the improved accuracy of Soviet ICBM's and its potential effect on the survivability of our ICBM forces, do you believe, General, that the silo basing option, even with a BMD protective system, closes the window of vulnerability sufficiently to justify the cost of both those systems?

General **Burke**. I think it holds out the potential. The point has to be proven that the ballistic missile defense will work and that it is affordable. That is what General Tate is now embarked on. I certainly hope he is successful.

Senator **Hart**. But shouldn't we know the answer to that question before we silo base the MX?

General **Burke**. The silo basing, first, is a fairly limited effort of 40 missiles. It is not billed as anything other than an interim measure. It alone does not provide any appreciable increase in survivability.

The attractions to doing that are: One, it maintains the pace of the program, and I think that is important, militarily and perceptually and also for arms control purposes. It just provides an interim home for it, as Secretary Weinberger says. If we agree that we want to keep the thing moving on track, it is either that or put them in a warehouse. Given that choice, clearly a silo is a better place than a warehouse.

Senator **Hart**. But that presumes that we ought to keep building the missiles before we know where to put them in a survivable mode.

General **Burke**. That's right. There would be the option of simply agreeing now to stop building that missile. But I think that would be wrong. Also, I think it would have enormously undesirable consequences if we just turned that missile off.

Senator HART. Thank you, Mr. Chairman.

Senator WARNER. As I understand the decisionmaking process on the location, it is between six options, six bases.

General BURKE. Yes, sir.

Senator WARNER. They were shown on your slide.

Now that decision will come from Brigadier General McCarthy, to you, and then it will be forwarded to the Chief of Staff of the Air Force, and then to the Secretary of Defense.

Is that correct?

General BURKE. Yes, sir.

Senator WARNER. General Burke, you have been before this committee for the 3 years I have been here in the Senate, and, as I understand it, for several years before that. How long have you been in your position?

General BURKE. This is my fourth year, sir.

Senator WARNER. So you have overlapped both administrations.

General BURKE. Yes, sir.

Senator WARNER. We have a rule here in the Senate Armed Services Committee that you are free at any time to express your personal opinion.

In your personal opinion, has anyone at this time tried to levy political considerations on you as you exercise your professional judgment with respect to the six options?

General BURKE. No, sir. There has been not one whit of that. Nor was there any in making the earlier decision to go to Minuteman versus Titan, which I think was probably against the first intuition of the administration. I think probably they thought Titan would look better than it did when we actually examined it.

Senator WARNER. At a subsequent time, when the committee begins to review the decision that is soon to be announced by the Secretary of Defense, you will feel free to be forthcoming in the recommendation you made to the Chief of Staff of the Air Force, will you not?

General BURKE. Yes, sir.

Senator WARNER. General McCarthy, do you have anything to add to that series of questions?

General MCCARTHY. No, sir.

Senator WARNER. I will turn now to Senator Levin.

Senator HART. Excuse me, but if the Senator would yield, I did not mean that any of the comments I made about politics were directed in any way that the General's or any of our witnesses' recommendations had been conditioned by politics. I did not mean that. I don't think there are very many people in the Senate or in the country who would deny that very heavy political considerations went into the decision not to base the MX in the way that the Air Force recommended was most survivable.

Senator WARNER. I just want to make certain that I am laying the foundation for a subsequent hearing of this committee so that the General would feel free to come forward to express his views. Did you wish to add something, sir?

General BURKE. Yes, sir.

In your list of the review process, I will like to insert the Secretary of the Air Force between the Chief and the Secretary of Defense.

Senator **Exon**. You covered yourself very nicely there. [General laughter.]

Senator **Warner**. Senator Levin.

Senator **Levin**. I am happy to yield for that kind of correction. [General laughter.]

Mr. Chairman, I am intrigued by the reason for building this interim solution, which does not give us our primary goal, which is survivability. This interim warehouse cost is $4 billion. Don't 40 missiles cost about $4 billion?

General **Burke**. To base them, or to build them?

Senator **Levin**. To build and base them in this interim scheme. What is the cost?

General **Burke**. Well, it is a bit more than that.

In the chart I showed, in 1982 dollars, to do the research, development, and production of the missiles, it is $15 billion.

Senator **Levin**. Just take the basing scheme, the interim basing scheme. How much is that?

General **Burke**. There is about $2.6 billion that is solely identified with putting them into the silos.

Senator **Levin**. So, it will cost, say, $2.5 or $2.6 billion for the interim basing scheme?

General **Burke**. Yes, sir.

Senator **Levin**. We are doing that, you say, in order to keep the program going and give us some momentum, arms control perceptions and a place to warehouse them. I am sure we can build cheaper warehouses. But I will lay that one aside.

At the same time that we are doing this for perception reasons, for momentum reasons we are discontinuing the Titan program prematurely, we are dismantling them, we are prematurely retiring the B-52D—during this very same period—to save $500 million, allegedly, most of which we believe is the cost of personnel, which won't be saved in any event. But I'll give the DOD their argument on this.

It seems to be that we are going in two absolutely opposite directions at the same time. We are dismantling the Titan's prematurely, we are retiring the B-52D's prematurely, despite the perception, despite the fact that we are getting nothing for it in terms of arms control. We are not even asking the whole bargaining chip theory. I just don't know where that stands, since you are talking about chips, if you stack it up against what we are doing to the B-52's and Titan's.

And yet, the only arguments I have heard of for going ahead with the interim basing mode, which does not achieve its goal of survivability, are the very things we are giving away for nothing with Titan's and B-52's.

I don't think this program makes sense from that perspective at all.

I would like you to put on your last slide again, if you would. I have a specific question regarding the quote at the bottom of the slide.

Senator **Levin**. It says that any ground-based scheme ultimately would require a ballistic missile——

General **Burke**. Oh, you want the last slide from General Tate's briefing.

Senator **Levin**. Yes, I'm sorry. That is right.

General **Tate**. That was a statement that appeared in the President's announcement on 2 October.

Senator **Levin**. Is that true with deep underground basing?

General **Tate**. Well, if you consider deep underground basing as a ground-based scheme, it actually is underground and not based on the surface.

Senator **Levin**. I see. So he is not referring there to underground basing?

General **Tate**. I am not certain just what the intent of the statement was, sir. I regarded that statement as probably not applying to deep underground.

Senator **Levin**. So you are not looking at deep underground basing with the BMD?

General **Tate**. It is not altogether thrown out. But it certainly is not a primary interest at the moment.

Senator **Levin**. General Burke, I think you are the right person to address the next series of questions to. They relate to the size of the MX missile.

As I understand it, the first procurement is nine MX missiles in fiscal year 1983, each of them 192,000 pounds and 92 feet long.

Does that sound about right?

General **Burke**. Ninety-two inches in diameter. You had said 92 feet long, but I don't thing that is right, sir. It is a 92-inch diameter.

Senator **Levin**. All right, then. Let's try it again. It is 192,000 pounds?

General **Burke**. Yes, sir.

Senator **Levin**. How long is it?

General **Burke**. About 70-some odd feet. It is 92 inches in diameter.

Senator **Levin**. OK. It is 70-something feet long and 92 inches in diameter.

Is that same missile going to have to be modified if we go with continuous patrol aircraft?

General **Burke**. No, sir.

Senator **Levin**. That exact same missile is going to be dropped from the aircraft?

General **Burke**. Yes, sir.

Senator **Levin**. 192,000 pounds?

General **Burke**. Yes, sir.

Senator **Levin**. That is the same missile that you say it will take weeks to install into the silo, stage by stage?

General **Burke**. Right.

Senator **Levin**. Are you studying different missile sizes now as part of your consideration of permanent basing mode choices?

General **Burke**. No, sir.

The basing modes at which we are looking are all consistent with the size missiles that we have. If one were to reopen the question of road-mobile or rail-mobile, I think you would be interested in smaller missiles.

Senator LEVIN. But right now, you are not looking at any changes in the design of that missile at all?

General BURKE. No, not at any fundamental changes in the size.

Senator LEVIN. Are you looking at any changes?

General BURKE. Well, I would imagine that a missile about half way through development, well, there must be engineering details to attend to.

Senator LEVIN. But nothing that relates to the basing?

General BURKE. No, sir.

Senator LEVIN. What happened between October—perhaps you covered this before I got here—and now? We were told that we ought to base the MX in superhardened silos. We were told that you would pick up a few very valuable years by doing it—very valuable years, in the words of the Secretary. It is a big gain.

Apparently we changed our mind. What happened since then—if you have not yet covered that?

General BURKE. Well, the first thing that happened is the Congress disagreed and wrote into the authorization a provision that is popularly known as the Cohen-Nunn amendment.

Senator LEVIN. Let me interrupt you.

We had Secretary DeLauer here the other day who said that even without the congressional intervention, he would not proceed in that way.

General BURKE. Well, sir, you said what happened. That was the first thing that happened. I would say, if it did nothing else, it got people to look at it and think about it.

I think Dr. DeLauer is correct.

I would not presume to say what the Secretary of Defense would have done. I think, in all likelihood, that the Air Force would have recommended against that. And we did recommend against superhardening.

It is not that you don't gain from superhardening, because you do. But it did not seem to be worth the costs.

Senator LEVIN. Was that before the Secretary's decision or since then that you recommended against the superhardening? Before October or after?

General BURKE. It was after October, and before the Secretary made a decision to go into the Minuteman silo, not superhard, which, in effect, was an endorsement of the Air Force recommendation.

Senator LEVIN. Does the decision of making a missile mobile or not impact on certain design criteria, such as shock resistance of various components, structural strength of the rocket body itself?

General BURKE. Yes, sir.

Of course, the canisterized MX is designed for mobility and has been from the beginning. We have always imagined a number of alternative mobility modes that would accommodate it.

The Minuteman, for instance, would require a fair bit of engineering to make it mobile.

Senator LEVIN. I think the last question I can ask within my time limit is this.

You indicated a chain of decision. I am wondering where the arms control considerations get into that chain in terms of ballistic missiles?

General **BURKE**. Well, they fit very much into my thinking, not only in terms of ballistic missiles, but in terms of all of the other features that I think we need to have.

Senator **LEVIN**. But the treaty that we have would have to be abrogated or in some way modified. I did not hear in your chain of decisionmaking, where our formal arms control folks are factored into that.

Are they working with you on the BMD considerations?

General **BURKE**. Well, perhaps we have done more of the liaison.

General Tate happens to live down in Huntsville, Ala., so he is only up here as infrequently as he can make it. [General laughter.]

But we visit the Arms Control and Disarmament Agency. Dr. Rostow and others over there have been briefed on these alternatives. As we really start this work, we do intend to keep them informed.

Senator **LEVIN**. Have they expressed themselves and their concerns to you?

General **BURKE**. No; they have not. But that does not mean that they won't when we get a little further down the road with it.

Senator **LEVIN**. Do you think it is premature for those concerns to be expressed now?

General **BURKE**. Well, it would be on a hypothetical basis; if you do this and if that happens, then I would object.

I think they are kind of waiting for the dust to settle before they express their views.

Dr. **KEEL**. Senator, may I respond a bit to your expressed concern over our simultaneously talking about the interim deployment of the MX while retiring the B-52's and Titans.

I think it is important, as you no doubt realize, that the first B-52D's, for example, cannot carry ALCMS and can't carry SRAM, and they are losing their ability very rapidly to penetrate. They are the oldest of our aircraft.

They have very limited capability.

Second, the Titan, although certainly a very significant member of our arsenal, especially in terms of megatonnage, obviously has one-tenth the warheads of the MX missile. It has about one-tenth the accuracy, including not being as effective in counterforce capability. The B-52 certainly is very vulnerable to pre-launch. They are not survivable, where their survivability is in question.

The Titan is less survivable than the MX, even in a Minuteman silo.

So, I would argue that the MX and Minuteman do, in fact, give us something other than a place to put the missile. It gives us increased counterforce capability, which we do not have with either one of those other two solutions. It gives us the capability to use up to 400 effective warheads to support our war plans.

Senator **LEVIN**. It does not have survivability.

Senator **HART**. What it gives you is a counterforce capability that is extremely vulnerable.

Dr. **KEEL**. Senator, the point I was making is this. The examples that the Senator mentioned with respect to having concern over one vice the other, it is more survivable than those two and gives you more capability. It is an interim solution and should be looked at only in terms of interim solutions.

Our intent is, in developing and deploying that missile, to come up with a permanent, survivable, and enduring basing mode.

Senator LEVIN. You don't have to have the interim solution in order to have a permanent solution.

My point is in the same interim period you are frittering away for a very small, relatively small amount of dollars, as these things go, a substantial capability which the Air Force does not want to give up. You are doing, in the name of helping to finance a $150 billion—I have forgotten the amount—the strategic improvement program. At the same time, you are arguing that you have to have an interim solution because it gives you momentum in arms control when you are giving up some capability with your Titans and your B-52's in exchange for nothing. You are not even asking, you are not even putting them down on the bargaining table.

I think that raises questions which I cannot ask because I believe my time is up.

Senator WARNER. Senator, I want to allow the Secretary to respond to that. I do intend to adjourn briefly for the vote.

Mr. Secretary, would you describe here for the subcommittee the importance of the MX missile decision to put them into interim silos.

Dr. KEEL. Well, the first thing you have to keep in mind, which has been addressed here, is that this is an interim step. The question is, an interim step to what? The answer is to developing an MX missile with the intent to deploy it in a surviving and enduring basing mode. That is our intent. That is what we will do, with the concurrence of Congress.

At the same time that we are developing this missile, it obviously becomes available in the 1986 time period, coming off the production line, and the question arises, is it, in fact, attractive to deploy this missile on an interim basis, even in a mode that is not a permanent solution.

Senator WARNER. Is there an enhancement in our overall strategic balance in deterrent?

Dr. KEEL. Yes, it clearly is in terms of counterforce capability. You add some 280 warheads, the most effective and important warheads that we have in terms of accuracy and yield to the force.

Senator WARNER. Senator Hart raises a very valid point about attacking this as a target. Your thoughts on that should be put into the record.

Dr. KEEL. It will be attractive as a target. Of course, all of our ICBM's are attractive as targets if the Soviets have sufficient numbers of warheads to target them.

Senator HART. This is a bigger and a better ICBM.

General BURKE. Senator, I think the distinction that has to be made is this. What is proposed is a very limited deployment. I would not think we would wish to add vast numbers of MX's in silos. I think the proposal is to do around 40; no way the Soviets can view that as a first strike disarming capability.

On the other hand, I think it is enough so that if I were wearing a Soviet uniform rather than the one I am wearing and perhaps were contemplating a decision on whether to increase the fractionation of my SS-18's, I think I probably would vote against that if I saw those MX missiles going in there and I think I would vote for it if I didn't.

I think we made a fundamental mistake in the 1960's in this country when we decided, and at one time put into law, that Soviet silos were sanctuaries and we choose not to threaten them. I think the Soviet response to that was to put everything they could think of into those silos.

I think this begins to say that that is not necessarily true in the future.

Senator WARNER. We will have to take a brief recess until we are able to return.

[A brief recess was taken.]

Senator WARNER. We have concluded questioning by Senators Exon, Levin, and Hart. The Chair will ask Senator Exon if he has any questions for the next round.

Senator EXON. Thank you, Mr. Chairman. I do have some questions.

Senator WARNER. Very well.

I will call on you first, after I have had a round of questioning.

Secretary Keel, had you been given adequate opportunity to express your views with respect to the enhanced deterrence value added by the interim MX missile basing?

Dr. KEEL. I think so, Senator. It was simply a recognition, a statement, of the fact that beyond the benefits from the standpoint of arms negotiation, we would have a stronger position from which to negotiate, that, in fact, you do increase your counterforce capability. You deploy 400 of the most effective warheads in your arsenal.

Senator WARNER. General Burke, had you completed your response to the question; namely, would it encourage the Soviets to achieve greater survivability for their strategic forces simply to posture them in a way more conducive to a first strike?

General BURKE. No, sir.

I think the initial deployment——

Senator WARNER. No, sir, what? Do you want more time?

General BURKE. No. I can embellish on that a bit now.

I think even the prospect of MX deployment already has caused the Soviets to begin to put more focus and spend more money on survivability. To the extent that they believe it really will happen, they are going to continue in that direction. When they see it, they are going to move into it in a very vigorous way.

I think we see that already in terms of their doing more submarines, more aircraft and cruise missiles, and even some interest in mobile ICBM systems.

I think this is very desirable, because all of those things cost a lot more than silo-based ICBM's

Senator WARNER. Dr. Keel, there has been considerable press coverage recently and discussion among my colleagues with respect to the selection of the ABRV for the MX. We want you to put your views into the record.

Dr. KEEL. Senator, the Air Force position on the ABRV was one of accepting it as being an effective addition to the MX warhead.

We were concerned about the cost, principally, and to some degree about the scheduling. We expressed those concerns to the Secretary of Defense. He met our concern with respect to cost, however. He gave us the money to go ahead with the ABRV.

It was our position, and is our position, that with those additional funds, it is an effective thing to do.

As you know, it is a more advanced reentry vehicle itself, with increased fuzing capability accuracy as well as increased durability with respect to weather and other effects. In addition, it has enhanced safety features in the warhead itself. With respect to the warhead, the warhead is a more efficient one, which uses less special nuclear material for a given yield. Or, to turn that around, it has a potential for a given amount of special nuclear material to give you an even greater yield.

Senator Warner. Senator Exon, do you have any additional questions in open session before we go into executive session?

Senator Exon. Yes, Mr. Chairman, thank you, I do.

Dr. Keel, as I understand it, the Commander in Chief and the Secretary of Defense must have been the ones who got their heads together and decided sometime prior to the October 2 announcement of last year that we should base the MX originally in the Titan silos, according to the testimony that we have received here today.

Is that basically your understanding of the matter?

Dr. Keel. That's correct.

Senator Exon. Did you take any part in those decisions?

Dr. Keel. No, sir. Quite candidly, I did not. As you know, I came on board during the August time period. At that point the decision was clearly elevated to the point where it was involving not only the Secretary of our Service and the Chief of our Service, but the Secretary of Defense and Joint Chiefs of Staff. I thought that probably would be no place for me to play and did not get actively involved in that decision.

Senator Exon. Does it strike you as a little bit unusual and does it not tend to confirm my suspicion that this whole matter of basing the MX in holes in the ground, whatever those holes would be, was evidently not a well thought out decision?

For example, we have learned since that October 2 decision that the Secretary and the Commander in Chief did, indeed, favor placing the MX in Titan holes, but subsequent to that announcement they have been persuaded by the Air Force that that would not be the place to put them, that if we are going to put them into holes, we have to put them into Minuteman holes.

This indicates to me that not much planning or foresight was taken into consideration by the Commander in Chief and Secretary of Defense on this decision.

Dr. Keel. Well, I guess it does not strike me quite that way, Senator.

I think, in fairness, there was considerable discussion, as you know, throughout last summer in which General Burke and others participated with respect to the overall decision on how to base the MX, but principally directed at what is a survivable basing mode. In the final process of making a decision, a decision was also made not only not to go MPS and pursue other long-term basing options for a survivable mode, but also that it did make sense to deploy the MX on an interim basis.

Intuition had it, and I can see, frankly, that that would be the case, that the Titan silos appeared to be the most attractive for that deployment.

It turned out with our own review of that, as you know, that now it does not appear to us to be cost effective.

Senator EXON. But that review was not made before the decision, evidently, was announced.

Mr. KEEL. No, sir, it was not.

Senator EXON. Thank you, Mr. Secretary.

General Burke, I would like to go back a little bit to the rather bleak picture that was painted in the initial briefing that you gave us, which fits in with another briefing that some of us have had within the last few days with regard to the Soviet "aggressiveness"—let me put it in that way—with increased ICBM's pointed at us and at our allies.

I take it that you share that concern?

General BURKE. Yes, indeed.

Senator EXON. General, we have 52 Titans in place at the present time, each one of them with large megaton warheads on it and each one of them targeted at some point at places in the Soviet Union at this time.

If we were to eliminate our Titans at one time—well, let my ask the question in this way. At this particular juncture, what percentage of our total magatonnage in ICBM's, land-based ICBM's, does the Titan represent?

General BURKE. I think, sir, that we probably ought to save that for the executive session.

Senator EXON. All right. I will ask you that in executive session.

Regardless of what that tonnage is, I am concerned about the fact that during the time when we are right in the middle, supposedly, of arms negotiations for a hopeful reduction in our ICBM forces we seem to be unilaterally disarming, further opening the window of vulnerability that we heard so much about in the presidential election compaign, by starting next October 1, at the rate of one a month, to disassemble and take out of the ground those Titans with the large megaton warheads.

With the bleak picture that was painted, I am wondering what sense it makes from a strategic standpoint if the bleak picture is true, to begin dismantling those Titans before we have our first MX in the ground in some form.

General BURKE. As weapons age, they inevitably lose value both for military application and as bargaining chips. I think it is possible to keep one to the point where, when you lay it on the table, about all you get is a snicker.

On the other hand, the longer you keep them, the more they cost to operate.

So, you start out with weapons that are very valuable and certainly very useful for arms control purposes, and which you can operate at a reasonable cost, and they get progressively more expensive and progressively less valuable. At some point everybody could agree that it is time to put them out to pasture.

We have kept some, I think, to a point where it just did not make any sense in the past. That was our famous Crested Dove program, where we used to keep B-52's that really were not flyable, just so that we would have something to count. I think the only people we fooled with that were ourselves.

The B-52D's and Titans are not at that extreme. They are somewhere in between, I think in a region where fairminded people can disagree as to whether now is the time, next year, or 10 years from now. Neither of them is going to be completely retired until around about 1987 at which time B-52D's will be over 30 years old and the Titans about 25 years old.

We have gotten a fair bit of mileage out of them. They are becoming pretty expensive. We think with the Titan we can save on the order of half a billion dollars, with its retirement, between now and 1987. We can apply that to our modernization effort. We think we can save even more with the B-52's.

So, it is a hard call. But, other factors being equal, I think all of us would have liked to have kept those.

Senator Exon. The only other factor not being equal is the expenditure that has been testified to here today, that it is going to cost about $500 million between now and 1987. That would be the savings; right?

General Burke. Yes, sir.

Senator Exon. Even on a 5-year program, that is roughly $100 million a year. I guess in comparision with a $215 billion budget, I find it difficult to justify pulling that large megaton weapon out of existence, even starting with the first one in October of this year.

I was at Offutt Air Force Base on January 9 of this year. I received a briefing as to how really and truly important and vital the Titan was in our overall defenses because of its large megatonnage; although, granted it was not as accurate a weapon as the Minuteman or certainly as the MX will be.

But there was no snickering at Offutt Air Force Base on January 9 about the potential troubles that the Titans would give a Soviet planner.

Let me put it in another way.

If we should be attacked and if we should launch those Titans while we have them at Moscow, it would not be critical whether they land in the center of the city or somewhere outside, would it?

General Burke. With the size they are, they do not require a very high accuracy for area targets or soft targets.

I meant to say if I did not that, clearly, neither TITANS nor B-52-D's are at the snickering stage. I was applying that to another program. Both of those systems contribute in important ways today and if we had additional money, we would wish to keep them to contribute for a bit longer. Sooner or later, though, we would want to retire them.

Senator Exon. Oh, I am sure we would—when we could put the MX into place. I think that would be the time for their retirement. If you had the extra $500 million, you probably would find some use along the lines of keeping those around at least a while longer until we got the MX in place.

Would that be a fair assumption?

General Burke. I would think so—yes.

Senator **Exon**. I have one last question, Mr. Chairman.

General Burke, let's go to the heart of this matter, that is, where the MX is going to be deployed, in what area in regard to the Minuteman. Regardless of where it is deployed, our present plans are for the first 40 to go therein. With what we have heard here today, with the speculative story that, as has been indicated, is not fully accurate, which appeared in the Los Angeles Times over the weekend, with the information that we have heard about the antiballistic missile system, and with the fact that I think you, I, and everyone else recognizes that, indeed, if we are going to leave the MX in the Minuteman holes for any extended period of time, we are going to have to do something to protect them, rather than to have them sit there like sitting ducks, it always has struck me as very unusual for an administration which wanted to close the window of vulnerability to instead take a route that we will take our newest and best 10 warhead missile and stick it in a silo that we know full well is already targeted by the Soviet Union with a high chance of destruction at Soviet option. To use an example, it seems to me to make about as much sense from a military strategy standpoint as from the point of view of a household, going out and buying 10 expensive new canaries and putting them in a cat-ravaged and accessible birdcage, hoping that the cat would ignore them. I suspect that he will not.

Given all of that, whether you agree with it or not, if the MX missile is to be used in Nebraska silos, can you unequivocally give the assurance here in public testimony today that no more farmland would be taken under any circumstances?

General **Burke**. No, sir. I obviously do not have the authority to make that commitment. It is my personal view that we should be very reluctant and loathe to use productive farmland for this purpose. My understanding is that, even when the Minuteman sites were selected, that was a criterion. I suspect it would be applied even more aggressively now.

I happen to come from farming people in another part of the country and I generally deplore the conversion of farmland to either missile fields, parking lots or shopping centers. I think we have done too much of that. I would think that we would not have to consume large amounts of farmland.

But if we went to ballistic missile defense, with or without some form of deceptive basing, then I think additional land would be required, though not large amounts.

Senator **Exon**. Of if we went into a deceptive mode.

General **Burke**. Yes, sir—and/or.

Senator **Exon**. Thank you, General.

Mr. Chairman, thank you for your patience.

Senator **Warner**. Thank you, Senator.

General Burke, let's go back to the intriguing hypothetical meeting at the White House that we referred to on the MPS.

That MPS system, for which you expressed a professional leaning, is that the same one that we considered at the time President Carter came forth with his recommendation, or is this something that would be substantially changed?

General **Burke**. The MPS system that existed up until October 2, 1981, had been modified in important ways from that which President Carter had announced in the fall of 1979, I believe in September of that year. He announced a system that had key elements, including maximum mobility, the ability to move in an unmanned way from any shelter to any other shelter very quickly. One of the distinguishing features of that system was a road network that happened to be in an oval, which the press immediately dubbed the "racetrack."

There followed discussions with this committee and others and another Defense Science Board Review in which that view was moderated and a great deal of the mobility was taken out, though not all of it. It became a less complicated system. It went from oval roads to straight-line roads and it did not have the unmanned dash capability anymore. But it was a clear descendant of what President Carter had announced.

Senator WARNER. Thank you.

Senator Levin, do you have additional questions?

Senator LEVIN. Yes, Mr. Chairman, thank you.

The GAO last week sent a letter to Secretary Weinberger about the MX program and said the following about ballistic missile defense: "Ballistic missile defense of fixed sites has previously been assessed by DOD as not achievable in the time period specified by the President's program."

Do you agree with that, General?

General TATE. I am not certain what time period you are referring to, Senator.

Senator LEVIN. Well, the decision date I presume was March 1983.

General TATE. Are you talking about the 1983 decision?

Senator LEVIN. Yes.

General TATE. Well, it is true that we could not deploy a system by 1983.

Senator LEVIN. Can you make a decision as to whether or not BMD is deployable by March 1983?

General TATE. Absolutely.

Senator LEVIN. Are you familiar with the letter that GAO sent to Secretary Weinberger about BMD a week ago?

General TATE. I am not.

Senator LEVIN. I am not sure that I have the right date, so I had better put a caveat on that. Perhaps you could obtain a copy of that letter and give us your comment for the record on that, if you would, sir.

General TATE. I would be glad to.

[The information follows:]

GAO LETTER

General TATE. A common baseline terminal defense system for fixed and deceptive basing of ICBMs is feasible and the system can be developed that could support a July 1983 decision and the [deleted] IOC. It would require a significant budget increase, a streamlined acquisition process, and a sincere commitment at all levels to develop this BMD system.

The [deleted] IOC objective requires that the program proceed on an urgent basis to design, develop, and test the major system components. [Deleted] which began with the Oct 81 Presidential decision. It is clearly not feasible to wait until after the July 1983 MX long term basing decision to accelerate the baseline terminal defense acquistion process nor is it reasonable to proceed on a constrained funding basis until that time. To do so would probably preclude the availability of a BMD option [deleted].

A comprehensive set of key tests and demonstrations at the subsystem level can be completed by [deleted] to assure that the system is effective and represents a low risk deployment option. Key components of the interceptor, radar, and data processing subsystems can be demonstrated, including interceptor propulsion flight tests at White Sands Missile Range. It is also planned to complete tests to prove the capability of baseline terminal defense components to operate in a stringent nuclear environment. Completion of significant milestones in planning for production, siting, construction, logistics, operational concepts, environmental impact, etc., will assure the ability to reach IOC in [deleted].

The Army's request for fiscal year 1983 represents a significant increase as compared to the fiscal year 1982 funding. The largest portion is required for the baseline terminal defense system ($662.8 million). Attaining the IOC is not possible without this kind of budget increase. Also, the requirement to develop a flexible BMD system design capable of defending ICBMs in either the fixed or deceptive-basing modes under consideration requires considerable front-end funding. The increase in fiscal year 1983 is principally attributed to system level hardware design and integration and with component testing to support the highly compressed acquisition cycle.

Senator LEVIN. What is the IOC of the interim basing mode of the MX, General?

General BURKE. It is 1986.

Senator LEVIN. What is the IOC of the continuous patrol aircraft?

General BURKE. We do not have an IOC for any of those three long-term basing modes.

Senator LEVIN. Not on any of them?

General BURKE. No.

Senator LEVIN. Do you have any ideas?

General BURKE. I think the late 1980's would be the earliest for any of the three—although I will defer to General Tate on ballistic missile defense.

General TATE. We would prefer not to talk about the IOC dates in open session, Senator Levin.

Senator LEVIN. Is the problem that it is classified or that we do not know?

General TATE. I do know. But I would prefer not to discuss it in open session.

Senator LEVIN. I see.

Well, in terms of the late 1980's and 1990's, the part that you can discuss in open session, would it be fair to say that the interim basing mode would be with us for perhaps 3 to 5 years?

General BURKE. I think that would be true in terms of the deep basing or the air mobile patrol. Probably deep basing is a little earlier than air mobile patrol.

Senator LEVIN. A figure of $3.6 billion as the cost of the interim basing mode itself appeared on one of your charts, so we will use that. I guess it is $2.6 billion for the silos themselves, and $1 billion for what?

General BURKE. About a billion for the depot and all of the things that would be common to the other mode.

Senator LEVIN. So, assuming that we get 40 MX missiles in 3 to 5 years, say, and a nonsurvivable basing mode, it will cost us $3.6 billion?

General BURKE. Well, no. You still have the things that you bought for that additional billion that are applicable to whichever other way you go. Perhaps you still retain those 40 in the silo as part of the long-term solution.

Senator LEVIN. Well, for example, if you went with continuous patrol aircraft, you couldn't use the equipment that is associated with the silos, could we?

General BURKE. The $1 billion thing you could; the same support facilities at Hill Air Force Base would be applicable. The $2.6 billion would not be transferable, but we could at least imagine that we would retain 40 in silos along with 60 in airplanes. That is one possibility.

Senator LEVIN. I am trying to get to a bottom-line figure. In something like 3 to 5 years, we will have an interim solution which doesn't achieve survivability at a cost of some $2.6 or $3.6 billion, is that it?

General BURKE. I would say that $2.6 billion is the correct number, and it provides the only MX capability for 3 to 5 years, and could provide additional capability over and above the long-term solution.

Senator WARNER. Senator, the Secretary must return to the Department of Defense and I am anxious to conduct a brief hearing with him in executive session.

Senator LEVIN. I am almost done, Mr. Chairman. If I have just 1 more minute, I will be able to conclude.

Senator WARNER. Very well.

Senator LEVIN. This is my last question.

Do you know whether there is more equivalent magatonnage in Titans and B-52D's on the one hand or in the 40 MX on the other hand?

General BURKE. Yes, sir. Again, if you will leave that for the executive session, I can give you the specifics.

Senator LEVIN. Can you just answer whether there is more in one or in the other in open session?

General BURKE. I am not sure. We are getting into a gray area and, if it is all the same, I would rather be sure.

Senator WARNER. The committee will now adjourn briefly and will resume the hearing in executive session, as soon as the Chair is assured by the chief clerk that the room is cleared.

[Whereupon, at 3:45 p.m., the subcommittee recessed, to reconvene in executive session.]

EXECUTIVE SESSION

Senator WARNER. We will now go into executive session, Dr. Keel, for any additional comments that you may wish to provide the committee. I know that you have time restraints, so we will try to be as quick as possible.

Dr. KEEL. Senator, I really have no additional comments for closed session other than to reemphasize from our standpoint that we are speaking for the Air Force and I will let General Burke speak for himself. I want to say that we are supportive of the President's decision in going forth with the program.

In addition, we think it certainly makes sense from our standpoint to look at the interim deployment of MX in Minuteman silos. In fact, having done that, it makes sense from our standpoint in terms of strategic balance to deploy them, keeping in mind, of course, that it is exactly just that. It is the first phase of a long-term solution of our coming up with a survivable and enduring basing mode for those missiles.

General **Burke**. May I add a word or two?

Senator **Warner**. General, do you wish to leave with the Secretary?

General **Burke**. I can leave a little bit later if you wish me to stay.

Senator **Warner**. Secretary Keel, we thank you very much for your testimony. You said you had to leave at 4. I know it is 4:02. We thank you.

Dr. **Keel**. Thank you.

General **Burke**. If I could say so, Mr. Chairman, most of the questions that I have received have dealt with history and the past. I want to emphasize that I am not spending much time looking back on this thing.

I think of the many options that we have before us turning the clock back is not one of them. Given the fact that MPS as I described it is dead, for whatever reason, I think the President's program—his total strategic program—is a very good one and I support it fully.

I think the administration is not unreasonable when it says its strategic program ought to be considered as an integrated, coherent package. Certainly I like the other elements of it. Given the ICBM area absent an MPS, I think we are embarked on the best course that we can. I think it is just an absolute imperative that we keep this MX missile development going. I do not see any prospect for successful arms control talks if we walk away from that.

I think the political consequences of that would be enormous and I think we would just invite the Soviets to continue that massive buildup in their silos. It is an interim step and a very expensive one, but at least it holds out the promise that we are going to get to where we need to go and where we ought to go.

Senator **Warner**. General, I respect the confidentiality that is needed in this decision chain. I do not want to violate it at all in any way or through questions try to violate it, but I was intrigued by some of the questions of my colleagues on the location or possible location among the six sites being in the tri-State area of the Wyoming-Colorado-Nebraska region.

Is a part of your consideration the factor of local public sentiment? Has there been a clear public sentiment manifested in any of those areas, in those three States?

General **Burke**. I think the public sentiment factor is more properly thought of at the political level than at the military level, although we try not to be unaware of it and recommend anything that would be patently silly. So far, at this stage of the analysis; we have focused on the technical issues.

Senator **Warner**. Just the technical issues?

General **Burke**. Yes.

Senator **Warner**. So in other words, supposing there are two areas that have identical technical data, you do not go back and try to canvass them to see which might receive it and treat armed service personnel or others a little more kindly?

General **Burke**. Well, our experience is that public opinion and political support have a very ephemeral quality. It so happens when we started out with the MPS in Utah—Nevada—and now I am guilty of looking back—we got ringing letters of endorsement and encouragement from both of the Governors of those States. But within a couple of years we were being denounced in the most strident terms by those same Governors.

Senator **Warner**. Very well. Let's go on to other questions.

General Tate has been very patient and I think we should allow him to begin his classified briefing.

General **Tate**. Very well, sir. I am very pleased to be able to present this briefing to you today. I think it will set into context the work that we have done in recent months which we did not have a chance to talk about.

Just as a quick review, our BMD program overall is still budgeted in three line items in the budget. Normally when we talk about the BMD program we are talking only about these two upper ones—the advanced technology program and systems technology program.

The advanced technology program is the one that is going to keep the new technology in the barrel that we can draw on in later years, particularly as we look downstream at tougher threats and wanting to have growth options for these systems.

The systems technology program is where low altitude defense work is centered. That really does account for almost all of the budget growth in fiscal year 1983.

The Kwajalein missile range amount—well, it is just to run that range and make it available to the Army and Air Force for their tests.

I ran through this slide very briefly during the open session. I will not belabor it other than to say that it does trace the history of the work that we have done in safeguard and site defense and now to LoAD. A LoAD system operates deep into the atmosphere. I show it here to indicate that we believe we have high competence in our technology and that we can proceed with such a system at a low level of technical risk.

In the exoatmosphere, of course, we are now doing work which is quite different from that which we were doing prior to 1972. In safeguard we had missiles that were guided by radar signals. They were very large missiles and used very large warheads of the [deleted] variety. We are now talking about [deleted].

Still, the combination of these systems as a layered defense gives us a very tough defense to penetrate.

The components that we began to develop in 1979 were generic components—an interceptor, a small interceptor with a nuclear warhead, a distributed data processor, and a radar at X-band, [deleted].

That was the generic system—to develop those components so that they could be applied in a number of ways, as far as packages either to defend MX in an MPS mode or silos, such as our Minuteman, based in them today.

We were putting most of our effort, back prior to the October decision, in the mode for defending MX. We had some relatively small effort going on defensive silos.

The package, as you will recall, was a defense unit platform upon which were placed the radar, the data processor and a canister containing [deleted] missiles that could be slid into an otherwise empty MPS shelter for the defense of MX in an MPS mode.

By giving a preferential defense to that MX, that is, by only protecting that one shelter with the MX in it as well as the one contained in this defense unit—we could gain a lot of additional leverage from that deceptive basing.

[Deleted.]

Obviously, when the MPS program was canceled, the work that we had done on that particular application of a defense unit platform ceased. The accelerated research and development program which we are now pursuing is looking toward a 1983 decision for the long-term basing of MX. The choices are to place MX in continuous patrol aircraft, use deep underground basing to defend MX silos, or use ballistic missile defense. If BMD is chosen as one of the modes to continue, we would anticipate going into an intensive development program sometime in [deleted] and eventually having the capability of deploying LoAD to defend those MX assets.

We certainly would intend to continue with our advanced technology so that we could have the necessary technology available for growth options or be able to provide growth paths for LoAD if the Soviet threat either becomes more numerous or more sophisticated.

We have looked at a lot of different basing modes for MX with the Air Force and we have tried to evaluate how we might defend MX in many different basing modes. The two that we have concentrated on in recent months are these: First, MX in fixed silos, if it should be the decision that we would continue to base MX in fixed silos after 1983; or, second, MX in deceptive basing modes, as was the desire expressed by the Senate in its discussions with the Secretary of Defense in the December timeframe. We looked at one deceptive mode called an [deleted].

We also looked at other schemes, including one that is called [deleted]. We have been directed in recent months to look for a common solution to those options. That is, to look for a terminal defense system that is sufficiently flexible in its design and in its performance characteristics so that it could provide a significant level of defense and ICBM survivability in whichever of those basing modes that might be chosen.

This slide illustrates those three primary modes. [slide deleted] First you see the existing Minuteman silos. If we should decide to permanently base MX in those silos, what kind of defense could we provide and what sort of survivability levels would it have?

Or, if we go back and put [deleted] could we defend that kind of complex and at what survivability levels?

Similarly, [deleted] and it makes a tremendous difference in BMD performance.

So we have looked for a common system that would be able to satisfy any of those basing modes.

Since we worked for about 2 years on LoAD, we thought it only prudent that we go back and give very hard scrutiny to those components—that radar, interceptor, and data processor—to see if it was still adequate for these new basing modes.

After a couple of months we were able to conclude that yes, those components can still do the job. They would not have the exact same performance, but we would be optimized for the job. For the X-band radar, [deleted].

Since the nuclear environment is less, we would be able to have somewhat greater performance from an interceptor of about the same size. Here we are talking about a missile that goes from standing start to [deleted]. We are able to look out to see the incoming RV's at altitudes of [deleted] and here we have a total action time for the system of [deleted] from the time we first see the RV's until we intercept them. But note here that the [deleted]. That is a very important point.

In the old MX/MPS system LoAD was only designed to be [deleted] effective. It could do its job with a [deleted] leakage, by design. [Deleted] in other words, have a [deleted] effective system as opposed to about a [deleted] effective system. For LoAD, we are using all the technology which was derived from safeguard and site defense. So we believe we can develop LoAD to do this at low technical risk and that we can reach an IOC in the desired timeframe.

Senator COHEN. General, how do you come up with figures like [deleted] leakage?

General TATE. That is done by a very sophisticated computer program that takes into account the performance of the radar and the interceptor. It puts in the nuclear environment and all of those things. Leakage can be quite accurately predicted in an analysis mode.

We have done this for many years and have had flight test programs in the past where we validate our calculations.

Senator COHEN. Do you have programs where you can validate it?

General TATE. We will be validating those factors during our R. & D. program, yes, sir.

Senator COHEN. Thank you.

General TATE. We have looked at a number of specific ways of basing these components—in other words, how to take a radar, interceptor, and data processor, and package it so that it can defend any of those targets.

Here is one, for example, [slide deleted] where you have an MX in a silo, and it can be [deleted] we can accrue a lot of leverage against a Soviet attack.

We also have looked at radars, [deleted].

As a matter of fact, if we look at this system, these two curves [indicating] are what we call drawdown curves, indicating that if we had [deleted] Minuteman missiles based in silos—fixed silos in this instance—and if they are not defended with a BMD system, a [deleted].

If, however, we defend it with a system such as the one depicted here, with [deleted], we could enforce this kind of drawdown curve where the reentry vehicles on those ICBM's would be able to survive after a very significant attack.

Senator COHEN. General, forgive me, I was not here earlier and I apologize. Let me ask you this question. [Deleted] would we then end up having spent money on BMD and then find we have a major policy decision saying we are not going to [deleted] therefore, all that money is wasted in the first place?

Should we make that decision first if we assume that BMD is the way to go?

General TATE. [Deleted.]

Senator COHEN. Certainly.

General TATE. The purpose of this slide is to show the value that you get from deceptive basing of the MX missile, as [deleted]. The first curve is the same drawdown curve that I showed in a previous slide.

But, if we now take about the same BMD components and use them to defend a deceptively based MX, we get a significantly different result. In this case we have added [deleted] but MX is now in a defended deceptive basing system. [Deleted] there is a scale change between these two curves which I point out to you.

Again, this is a [deleted].

For defended deceptive basing, the costs for BMD do go up somewhat since we have to add some radars. The BMD cost is affected by the specific basing scheme for MX which we are defending. It would go up, we would estimate, on the order of [deleted] if we had [deleted].

So there is a great deal to be gained by deceptive basing [deleted].

This is our current LoAD accelerated development program. [Slide deleted.] We started out with a small amount of funding in 1980. That has picked up significantly in this fiscal year and, of course, you are familiar with the current request for $663 million in fiscal year 1983.

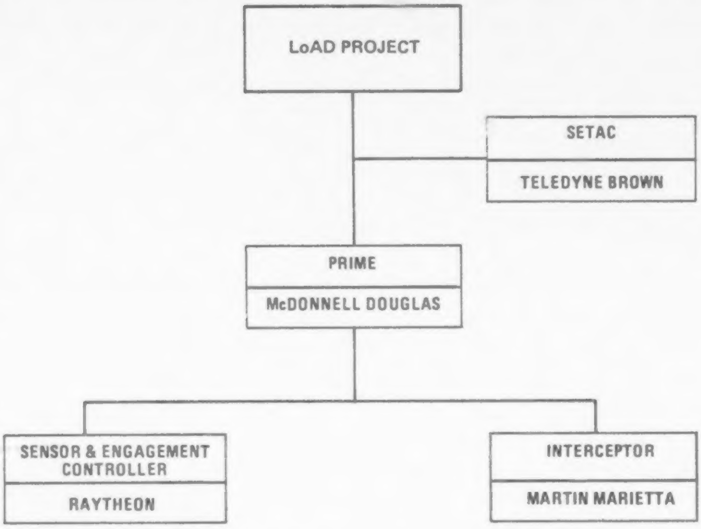
We are currently proceeding with a system and subsystem design and development phase. We are trying to accomplish as many significant events as possible prior to the end of [deleted] so that that information would be available to the President and the Secretary of Defense when the decision is made in July of 1983 as to which of the long-term basing modes for MX will be continued.

I would point out that in this slide you will note there is a fair amount of concurrency between the development and the production. That is necessary in order to attain the IOC date that we have been given by the Secretary of Defense, which is [deleted].

The large fiscal year 1983 increase is absolutely required if we are going to support an early IOC date of [deleted]. That is only [deleted] from the point of decision. I am sure all of you have studied the amounts of time required to develop and deploy major complex systems. That is a very short time in comparison to most that have been developed in the recent past. It will require a very vigorous program, but if we are going to reach that IOC date, we have to move out soon to conduct systems level development testing at national ranges. [Deleted.] It is fairly expensive.

I would point out also that we are going to be catching up from years of reduced funding in the BMD arena, all of those years when we spent very little money in systems level work—from about 1974 to 1980.

LoAD CONTRACT STRUCTURE


LoAD PROJECT

SETAC
TELEDYNE BROWN

PRIME
McDONNELL DOUGLAS

SENSOR & ENGAGEMENT CONTROLLER
RAYTHEON

INTERCEPTOR
MARTIN MARIETTA

The contract structure that we have today is illustrated. McDonnell-Douglas is the prime contractor for this terminal defense system. We have as major subcontractors Raytheon for the radar and data processor, and Martin-Marietta for the interceptor.

That team has been on board with us for 2 years now, and we are ready to accept the additional money that we have requested in fiscal year 1983, and we can intelligently use it. In fact, we must have it if we are going to be able to protect [deleted] IOC date.

Senator COHEN. General, what is the total amount of money that would have to be spent, say to [deleted] to give you the capability to go to BMD and LoAD in [deleted]. What would be the amount of money to be spent by [deleted] when you have to make that decision?

General TATE. Well, at the current time, Senator Cohen, I only have a budget that is firmed up through fiscal year 1983. Because of the intention to make the decision in July of 1983, I do not have firm budget guidance past fiscal year 1983 at this point. So the previous slide, those amounts that I showed, would be expended through fiscal year 1983.

Senator COHEN. The reason I asked the question is this:

You might find, having spent x amount of dollars between now and [deleted] the pressure would be on to say look, this is something we spent a good deal of money on. It is ready to go. We can have it in place by [deleted]. Therefore, [deleted]. That may be the way to go.

I just get a little bit concerned that we are taking it one step at a time without thinking through exactly what is going to happen. Because if in fact we had a new administration, let's say, in 1985, and I hope that is not the case, but assuming that you do have a new administration in 1985, they can say, my God, do you mean we are going to scrap that? Let's go back to a mobile MPS system or something else. And then we will have wasted all of this R. & D. money on this particular investigation.

So I just get concerned that we are starting down a track and not thinking about what the real options are going to be or are dealing with the political realities of what they might be. We could find ourselves spending a good deal of money pursuing different options when we have not really decided.

I would like to see, for example, a decision by this administration, saying if it is feasible—and you seem to indicate that it is feasible—then let's make the decision as a package so that we know what the decision will finally be. I think what will take place is we will spend a lot of money and we will come back to a new policy decision saying we are going to reevaluate this. We think this is destabilizing. We think if we go to an ABM system now it would be squeezing the finger around the trigger—the hair trigger—even more. Therefore, we have to find a better alternative, which may be scrapping the MX and going just to D-5 or Trident or whatever.

I think by going down these tracks—and this is a personal judgment of my own—without deciding what we are going to do as a policy is going to lead to more paralysis, more postponement, more delay, and ultimately to no systems.

General TATE. Senator, it is true that over the last 10 years or so we have been locked into an offense-only frame of mind. We have paid very little attention to our strategic defenses and we have allowed them to deteriorate very seriously. Many of us think that was not a good idea and that there is a value to defense.

This administration has made that very plain, that they intend to restore some sort of balance between offense and defense. We certainly support that idea because we believe that there is something to be gained by defense. Not only can you make things more survivable—our strategic weapons more survivable—but you can throw into the Soviets' minds an element of doubt and uncertainty which simply does not exist today [deleted].

I personally do not believe it is a good idea to allow the Soviet planner the luxury of planning anything he wants to do without having to worry one bit about our strategic defense. I just don't think that is a good national policy.

Senator COHEN. I do not disagree with you, General. What I am saying is, if I were a Soviet planner, I would take a look at the history of the U.S. Congress and U.S. administrations and say that they start down a track only to stop and start down another track, only to stop again and go down a third one, and they rarely make a decision.

It seems to me we may be doing the same thing here by spending money which I think is wisely spent, only to find ourselves in a [deleted], suddenly you will have a brand new policy that will say we do not like that idea at all. We want to go back to a different system or we want to try something else.

This is not your dilemma, General, but it is something that I see coming down the road.

General TATE. Well, I guess, Senator, what I would point out is if this country wishes to maintain an option to deploy a BMD system to protect its strategic offensive assets by [deleted] we simply must spend this kind of money up front or we are not going to be able to do it. It is just that simple.

General **Burke**. General Tate, there is another point that could be made, and that is the Russians have options too, [deleted].

Senator **Cohen**. [Deleted.]

General **Burke**. We would want to spend at least enough money, even if we absolutely decided we weren't going to go with ballistic missile defense. [Deleted.] I think we have to do something then. We also have to continue our advanced reentry work in that same general vein—how much is arguable.

Senator **Warner**. The point is well taken on both sides. Did he give you the answer to the money end of it?

General **Tate**. I can only provide the budget information through 1983, sir, because our budget right now is only firm through fiscal year 1983.

Senator **Warner**. Well, looking at that almost exponential growth, that is a lot of money.

General **Tate**. Yes, sir, for this system it will be on the order of $900 million through fiscal year 1983 for this terminal defense system.

Senator **Warner**. Secretary Hoeber, would you like to amplify any of the dialog here or provide your view?

[The prepared statement of Ms. Hoeber follows:]

Prepared Statement by Ms. Amoretta M. Hoeber, Principal Deputy Assistant Secretary of the Army (Research, Development and Acquisition)

INTEGRATION OF BALLISTIC MISSILE DEFENSE WITH MX

Mr. Chairman and Gentlemen of the Committee, Ballistic Missile Defense is potentially a mainstay of the overall strategic posture of the United States. One can, in fact, view BMD as a potential fourth leg of the Triad. It is a national obligation of the Army to make BMD a fully available potential component of the U.S. strategic posture. The Army is committed to ensuring that a greater amount of realistic attention is paid to BMD for this set of reasons, and that appropriate options are available for the future strategic decisions.

During the last decade the Ballistic Missile Defense program has been a Research and Development (R&D) effort constrained in resources and directed by specific program guidance in limited pursuits. During this time the main focus of the BMD program was to develop and demonstrate BMD-relevant technologies and validate system concepts in order to provide a hedge against technological surprise and to maintain a significant capability in reserve. Today, based on the 2 October 1981 strategic modernization program decision, more resources for BMD are planned, but considerable focus and some redirection is required. The major thrust of the BMD effort today is thus to provide an adequate assessment of defensive options for increasing the survivability of U.S. strategic forces.

This assessment is to be provided in a timely fashion assuming a 1983 decision. Further, the options assessed are to be structured in such a fashion that if a decision were to be made to deploy ballistic missile defense, a [deleted] initial operating capability could be achieved.

Consequently, we must ensure that the BMD program maintains a steady and systematic development path which can provide a wide range of possible deployment options for defense of ICBMs and other high-value targets in the event the national leadership chooses to move in that direction. Intensive Army management and attention to the direction of the BMD program in this regard are being provided at the highest levels. General Tate, the BMD Program Manager, will provide details. But let me first outline what we see emerging as the program objectives and structure.

PROGRAM OBJECTIVES

[Deleted.] The main near-term objectives for the BMD program are:

To design a baseline BMD system which has flexibility and endurance and which accommodates, as much as feasible, the alternative ICBM basing concepts directed by the President's 2 October decisions. No longer should BMD concepts be in detail driven by the details of optional ICBM basing schemes, since finalization of the concept would then be delayed and since combinations of schemes may well be among the options considered. Rather, a BMD system which is independently effective and which can incorporate changes in basing, or, for that matter, combinations of basing types, is the central objective.

To design appropriate variations in this baseline scheme to provide flexibility in quantities, spacing, packaging [deleted] basing, and software.

To develop and test the baseline system in such a fashion as to be consistent with providing an option for meeting an IOC of [deleted].

To take all reasonable steps in achieving the above objectives to provide by [deleted] as much feasibility verification and analyses as possible in support of a July 1983 decision.

The primary long-term objectives for the BMD program are:

[Deleted] to develop an endoatmospheric nonnuclear kill system for application [deleted].

To continue development and design efforts to attain an enduring exoatmospheric overlay system.

To determine the capability of the analyzed systems to [deleted].

To ensure a coordinated and integrated strategic program, the Army leadership is intensively involved in directing the BMD program as well as in the coordination of its efforts with the Air Force MX program.

PROGRAM STRUCTURE

The current program structure is being reviewed to insure that changes do not reduce the use made of the technical progress of the last two decades. The R&D effort has consisted of two complementary program elements—the Advanced Technology Program (ATP) and the Systems Technology Program (STP). The ATP is a broadly-based research effort designed to advance BMD relevant technologies and to explore potentially revolutionary system concepts. The STP integrates those technologies for transition to systems applications in BMD system concepts and validates key issues through simulation as well as laboratory and field testing. (Incidentially, the BMD Program manager also manages the Kwajalein Missile Range (KMR) as a national range, however, I will not address this function any further today.) Progress has been significant in both the ATC and STP programs—the technology base has been expanded and advanced and the system concepts explored have included those employing radar netting, deceptive basing, long wavelength infrared (LWIR) optics and a variety of kill mechanisms. Rather than simply expanding these efforts, however, the focus will now be on using what has been accomplished to achieve the above-listed objectives. Three of the main efforts in this regard are discussed below, and General Tate will expand on them.

THE BASELINE BMD SYSTEM EFFORT

Much of the baseline BMD system definition and development will be a natural extension of what has been called Low Altitude Defense (LoAD). Under the new plan, however, the program will clearly experience some conceptual changes due to the Administration's decisions this past October on MX basing. The emphasis will be on designing and developing a "common system" which is compatible with deceptive ICBM basing as well as fixed nondeceptive basing. The technology for this appears available based on the previous programs to develop to LoAD interceptor, radar, and data processor, although all of the components designed for LoAD need further work. At the moment the baseline system concept envisioned includes the use of [deleted]. The principal technical issues which remain to be resolved regarding the [deleted] issues regarding the [deleted]. Overall system performance is dependent on resolving these issues individually and jointly and on establishing confidence that such a complicated combination can endure in a stressing environment.

Again, intensive management within the Army is focusing resources in the pursuit of the critical unknowns for the baseline system. We believe that tests and demonstrations of some components of all the subsystems can be accomplished by [deleted] in order to resolve the principal risk areas and ensure a high confidence selection.

ENDOATMOSPHERIC NONNUCLEAR KILL (ENNK)

A variety of reasons, which will not be addressed here, make the pursuit of an ENNK capability important [deleted] a major increase in effort directed toward resolving the technical issues regarding ENNK is planned. This area is likewise receiving prime attention from the Army leadership. ENNK interceptors are being viewed as potential replacement or augmentation options [deleted] so some of the uncertainties addressed above apply. Further uncertainties include the ability to [deleted].

Development efforts to resolve these issues will be pursued vigorously.

EXOATMOSPHERIC DEFENSE (OVERLAY)

In addition to the above pursuits, in order to provide for one potential growth path, work will continue on the exoatmospheric defense program. Emphasis is being focused on developing an exoatmospheric defense which could by used in conjunction with an endoatmospheric system. This is, however, a long-term effort and it should be recognized that the [deleted]. Analyses are being made of different kill vehicles, [deleted] interceptor [deleted] requirements, threat tracking requirements, and potential interceptor performance. During [deleted] Homing Overlay Experiment (HOE) flights are planned. These should demonstrate [deleted]. This test, if successful, will contribute toward resolving uncertainty [deleted] efforts of the BMD program.

There are unknowns associated with exoatmospheric defense [deleted]. The programs being pursued are designed to address these issues.

TREATY IMPLICATIONS

The BMD program consists of R&D only, and complies with the provisions of the ABM Treaty, which prohibits developing and testing in a mobile mode as well as the developing and testing of multiple kill vehicles. [Deleted.]

SUMMARY

In summary, the BMD program is a major option in the nation's strategic modernization program. The Army is committed to balance the BMD efforts among the major objectives discussed above and provide high confidence options for the planned decisions. This will be accomplished through a vigorous R&D program exploiting available and emerging technologies to increase the cost-effectiveness of BMD systems, to guard against technological surprise, and, most importantly at this time, to mature the technology associated with future system concepts.

Ms. HOEBER. I was going to start in with the point that General Burke made, that it really is not our choice. I am sure you are concerned, Senator, about the issue of how much money would be spent, but then the relevant question, really is how much additional money are we spending for this particular option as compared to what we would have to spend for the technology anyhow. And you are looking at just that differential.

Senator COHEN. Let me give you an example. I think the General indicated that if you combine [deleted].

Ms. HOEBER. But that was deceptive based. It is not limited just to a mobile missile.

Senator COHEN. Tell me how you are going to deceptively base the MX if you are not going to make it mobile on land? What will you do?

Ms. HOEBER. Well, you make it moveable rather than mobile. It would shuttle among a variety of different silos, say, in the MX field, for example.

Senator COHEN. Well, I am confused. How does "mobile" differ from "movable"?

Ms. HOEBER. I am sorry. The normal concept of "mobile" is the missile on the track that wanders around on the roads, either in the MPS system or some other faction—the racetrack, for example.

What I was referring to were the sorts of [deleted].

Senator COHEN. How does that differ from what we are told the Air Force recommendations was back in December of 1979, which was a vertical MPS system?

Ms. HOEBER. Do you want to comment on how the current one differs?

General BURKE. I think the term "deceptive basing" was provided by the Congress. I think different people would have different interpretations of that. When I am asked what it means, I say I only know what it doesn't mean. It does not mean 4,600 missiles on the shelf in Utah and Nevada.

Senator COHEN. General, tell me what the difference is between "mobile" and "deceptive." There will be movement of the missiles. What I want to know is how does that differ from the vertical MPS that was originally recommended categorically by General Allen. In Janunary of 1980 you said that this was the Air Force recommendation. It is the best, most cost-effective, efficient mobile MX we can come up with. And we ran into a whole array of problems because of SALT II.

Then we started getting into an air-launched missile, and then we went back to the quonset hut theory and then the race-track. How does it differ from the vertical? What you are showing me on the board is not much different, if you are talking about a mobile-based MX.

General BURKE. My recollection is the Air Force recommendation for the vertical shelter was in January of 1979, and during the year 1979.

Senator COHEN. I think it was in December of 1979 when there was the final report of the Air Force. We took it up in February of 1980. As I recall, it was December of 1979 and only 2 months had elapsed. I will not take up any more time, Mr. Chairman, with this, but 2 months had elapsed before there was a shift from the Air Force's recommendation from 1979 to 1980. I believe at that time, notwithstanding the denials by the then-administration, it was principally due to SALT II considerations and had nothing to do with whether it was the best system.

General BURKE. I am sure, SALT was a major factor in the minds of a lot of people. The reason that was given by the President was that he wanted the additional survivability by a second mode.

Senator COHEN. I do not want to carry this debate on to the total realm of irrelevance. All I was suggesting was, you start saying well, we have to spend the money anyway, we are coming back now to look at mobile or deceptive basing because Congress says we ought to have deceptive basing.

Let me tell you why we said that. There is some notion that has been promoted in the papers that somehow the Pentagon is saying the devil made me do it, whether it was the Nunn-Cohen or Cohen-Nunn amendment that forced us into this bad situation where we cannot talk about hardening of silos. The reason the amendment was offered was that for 3 years we heard testimony telling us that the hardening of silos doesn't give you anything. It does not give you enough to make it a viable, survivable system.

Now we hear you saying Congress made us do it, and now Congress is dictating deceptive basing. We'll go back over the 3-year period of time that I have been here. The Air Force has come in each and every time saying we have the survivability. Survivability means mobility. If you do not have it mobile, it is not going to be survivable.

So it is like somebody turns around and the Congress has dictated or mandated deceptive basing and that is going to escalate these costs. We are just trying to respond to what the evidence has been to date.

General BURKE. Sir, in fairness to your position, I testified earlier that the Air Force had recommended, irrespective of congressional action, that superhardening was not worth the cost. It had some value. It also had a very big price tag and our recommendation was not to do that.

The Air Force would also endorse your notion that [deleted] and that was the principal finding of a major Defense Science Board review this last fall.

Senator COHEN. The reason I am raising this question is that I look at those figures and I find there are still significant amounts of money going for big bird research and development.

General BURKE. Not at this juncture. In fact, I just testified over at the House this morning and I showed a slide—an artist's portrayal—of Big Bird. The chairman of the subcommittee challenged me as to where I had gotten the money to make that slide because he said you are on a very strict prohibition not to spend money. I assure him that we had acquired it last September.

We are not spending any money right now. Dr. DeLauer has been talking to the committee and the staff, and his proposition was that he would like to do an in-house study as to the survivability of a big bird concept and if that looks encouraging then come back and ask for some money to spend. But right now we have a prohibition against spending any money, and that is from the authorization conference.

Senator COHEN. The whole point in my raising the question, General, and I will leave it so that you can get on with the presentation, is this. I have seen a pattern repeated since I have been in here, and that is, we start studies. We fund them. We do not make the fundamental policy decisions of what we are going to do, though.

Then you run into a criticism saying that you really should not go ahead with the MX until you finally get a basing mode, and that you will build this year or next, and you may not have MX. Then the argument would be turned around. It used to be, let's go ahead with the missile and then decide about the basing mode later. Now the argument is going to be, let's go ahead with the basing mode and decide about the missile later.

We are going to go around and around. So it seems to me that what we have to do is make policy decisions first and then at least try, perhaps coterminously, to, fit in the R. & D. to work with that. But if we start doing what I think we are doing, and that is going down the separate tracks, I guarantee you in 1985, if I am still here and if you are still here, that we are going to come back in and say we don't like that policy. We had better try a different one.

General BURKE. I would hope that you are and I am not. [Laughter.]

Senator COHEN. There are some who would disagree with that sentiment. [Laughter.]

Ms. HOEBER. I was going to say, as I understand the October decisions, it was our job to do the R. & D. to find out whether the options were real and realistic in the timeframe so that policy decisions would be made in 1983. Today we do not have the R. & D. quite at an advanced enough stage to make that decision, in my view. That is why we need to do this next year and a half's worth of work.

Senator COHEN. Are you saying that in 1983 we will be in a position to make the policy decision as to what we are going to do?

Ms. HOEBER. I believe the Army then will have provided the adequate basis for a decision. Whether it will be made at that point is well beyond my pay grade.

Senator COHEN. Well, then, there will be no excuse for us, whoever the "us" is—the White House and the Congress—then not to make a decision?

Ms. HOEBER. I believe so.

Senator COHEN. That is all I have, Mr. Chairman.

Senator WARNER. Had you finished, General?

General TATE. No, sir, I hadn't finished.

Senator WARNER. Please proceed.

General TATE. I wanted to cover a couple of other aspects of the program that I believe the subcommittee is not aware of.

There is a current [deleted] that kind of system. For technology, we are looking at small hit-to-kill vehicles at [deleted]. We are also looking at larger systems with a more conventional warhead and fuse to see how we might like to evaluate their utility.

Obviously, a non-nuclear system has some great advantages. It does not use strategic nuclear material. It is more acceptable to the U.S. public in general, and it is simpler to get the release of those weapons.

We have been looking at two different kinds of systems—both the hit-to-kill and the large warhead and fuse kinds of systems. If you are going to use a warhead and fuse, even if you don't hit the incoming RV, you are going to have to get very close to it.

The issues are really shown over here (indicating). [Deleted.]

With this kind of non-nuclear system, we believe we can eventually enforce a fair number of intercepts [deleted].

So, our overall strategy is similar to what I briefed this committee on a year ago. We are still looking at layered defense, consisting of an underlay, or terminal system in the endoatmosphere and an overlay defense in the exoatmosphere. These systems are considerably different. I pointed out some of the differences in our ongoing existing work compared to what we were doing a year ago in that preprototype system development of the LoAD system.

In the exoatmosphere, we have some considerable differences in the system we are now pursuing as a result of studies done over the last 4 or 5 months. You will recall we had a [deleted].

In the concept that we briefed to you about a year ago, we had [deleted.] By using those we believe we have a cost-effective system which has the ability to reach out and begin the engagements at ranges of [deleted] miles and begin to attrite the Soviet RV's at significant ranges.

Putting these two systems together here in a layered defense system makes it very tough indeed. [Deleted.]

The technology that we are pursuing will make this exoatmospheric program believable as in these programs that are validating the technology. During the past year we had another two of our designating optical tracker [DOT] flights. We have now had four successful flights in four attempts which have indicated very convincingly that we can launch these out of Kwajalein and look at Air Force ICBM-class vehicles, pick them up at long range, [deleted] we are going to make the first attempt ever made to engage an ICBM range reentry vehicle with a nonnuclear warhead. That is with our homing overlay experiment [HOE]. We have that experiment planned for four flights over 12 to 15 months. It will be a significant experiment.

We are also continuing the work to develop [deleted] been successfully tested on our designating optical tracker vehicles.

That LWIR technology is coming along quite well. A spinoff of that technology, and one in which the Senate has shown a great amount of interest in the last year or so, is this survivable optical forward acquisition system, to improve our national capability for tactical warning and attack assessment.

The application of this kind of technology for this purpose would allow us [deleted].

The Senate took a sufficient amount of interest in this last spring to actually vote $31 million to get this program started in fiscal year 1982. However, that proposal died in joint conference. The technology is still available if we wish to pursue it, though it is not funded at this time.

To sum up, some of the options that we believe we can provide in the BMD program, here I would make the assumption of a [deleted] and the dollar costs that you see are in fiscal year 1982 dollars for the BMD acquisition costs. It assumes we get a favorable decision in 1983 to continue with our BMD Baseline Terminal Defense program.

We know today our Minutemen, as they exist, [deleted] components, and protecting our ICBM's—that are not deceptively based, that is, [deleted] these would be for fixed ICBM's—we could provide a significant level of defense for the amounts of dollars shown here. [Deleted.]

We also could add layered defense at an incremental cost of about another [deleted] to be able to [deleted].

Again, if we continue to pursue this endoatmospheric, nonnuclear kill and validate that technology, we could also sweeten the defense with those nonnuclear interceptors for low altitude or terminal defense.

In summary, then, we believe that the technology for a BMD system is sufficiently in hand that we can proceed with confidence. We have looked at this common system that would have sufficient flexibility to defend either fixed-base ICBM's or deceptively-based ICBM's.

We believe that it is possible to have such a system. We [deleted] the nonnuclear kill interceptors to augment a nuclear system that might be deployed first.

The exo-system provides a multimission capability because it has a very large [deleted] and it can defend many other targets other than just ICBM's, [deleted].

We believe we can support the President's 1983 decision with the program that is now ongoing and that we could also support an [deleted] IOC, provided we get sufficient funding and a streamlined acquisition process is adopted to get some decisions at the right time.

As I mentioned previously, [deleted].

That completes my briefing.

[The prepared statement of General Tate follows:]

Prepared Statement by Maj. Gen. Grayson D. Tate, Jr., Ballistic Missile Defense Program Manager

INTEGRATION OF BALLISTIC MISSILE DEFENSE WITH MX

OVERVIEW OF PROGRAM CHANGES

(U) In December 1979, the BMD Organization (BMDO) initiated a generic Low Altitude Defense Preprototype Demonstration (PPD) Program to demonstrate the technology for a LoAD System to defend land-based ICBMs deployed either in Mulitple Protective Structures (MPS) or in silos. Elimination of the MPS basing option for the M-X on 2 October 1981 has resulted in the reassessment, reorientation, and reoptimization of BMD program efforts. The BMDO, in conjunction with the Army leadership, is currently intensively reassessing the BMD program from the perspective of the announced strategic decision to be sure the program is heading in the right direction both technologically and programmatically. This is necessary to provide the national decisionmakers with valid data on which to base their decision on whether BMD should be selected for deployment to enhance the survivability of US ICMBs over the long term.

In particular, the BMD program is being redesigned in order to develop a "common" defense concept that can defend MM silos, M-X interspersed in MM fields, M-X in modular array basing schemes, or M-X deployments that may be variants of these. Since the administration intends to explore defended deceptive basing of ICBMs as well as fixed nondeceptive basing, a common system compatible with either basing option will be pursued in the restructured program. This "common" defense system is being pursued as an evolution from the LoAD program, which in turn derived from the experience gained from the Safeguard and Site Defense programs. Thus the "common" defense system would conceptually incorporate [deleted]. In [deleted] could arrive would be searched; detection and discrimination would be performed; and threatening RVs intercepted.

BMD/MX INTERFACE

A formal Memorandum of Agreement (MOA) between the BMDPM and the Commander, US Air force Ballistic Missile Organization (BMO) was signed on 7 October 1980. This MOA formalizes the relationship between BMDO and BMO, outlines policy and responsibilities, and provides for interchange of technical operational, and programmatical information. The M-X Program Office, within the BMO, is the BMD Program's greatest source of interaction with the AF to ensure the interoperability of BMD and M-X. Specific areas include engineering development; basing; command, control, and communication; maintenance of deception; organizational and operational concepts; physical security; and support facilities. Coordination channels have also been established with the Air Force Strategic Air Command (SAC) and Air Force Test and Evaluation Center, both of which will play a major role in effective development of BMD and ensure the ability of both systems to operate with each other. Of those M-X basing schemes so far under study there appears to be no problem of compatibility. In fact, elimination of the MPS basing scheme relieved the pressure of several technical design drivers such as an extreme nuclear environment, preservation of location uncertainty (PLU), design of the defense unit platform, and technology to "breakout" through the M-X shelter roof. In addition to the above AF organization interface, the BMD Systems Command maintains close

Army/Air Force coordination with the Air Staff, Office of Special Intelligence, AF Weapons Laboratory, Foreign Technology Division, AF Geophysics Laboratory, Electronics System Division, Space Division, and NORAD/ADCOM.

TECHNICAL ISSUES

The "common" defense system technology is relatively mature since it is based on extensive experience gained with previous successful terminal defense technology programs. Much of the technology developed and demonstrated in Safeguard, Site Defense, and the recently completed Systems Technology Validation Program was incorporated into the LoAD system and remains in the current program.

There are, however, still unknowns. The principal technical issues which remain to be resolved include [deleted].

GROWTH PATHS

The type of BMD system described above can significantly increase the survivability for our ICBMs (MM and M-X) against the projected [deleted] threat. Growth paths are needed, however, to counter an [deleted] of Soviet reentry vehicles. Growth can be accomplished with exoatmospheric defense (XD) and endoatmospheric nonuclear kill (ENNK) technology.

ENDOATMOSPHERIC NONCULEAR KILL (ENNK)

Consideration has been given to a terminal defense design that is compatible with the use of interceptors with either nuclear or nonuclear warheads. While benefits are associated with the nonuclear warhead (greater public acceptance, ease of transport and deployment, no nuclear release requirement. [Deleted] no self-inflicted nuclear blackout, greater testing flexibility during R&D and deployment, and greater siting flexibility) its feasibility is dependent on the [deleted] BMDO planning includes development of the capability to deploy ENNK interceptors to replace or augment nuclear interceptors in the "common" system.

EXOATMOSPHERIC DEFENSE (OVERLAY)

A layered defense would consist of two tiers of defense that would operate together to minimize the number of reentry vehicles penetrating. A first tier (overlay) would intercept at long range exoatmospherically. A second tier (underlay) would be a terminal defense system, operating entirely endoatmospherically. The underlay would engage only those reentry vehicles that penetrate the overlay portion of the defense.

The baseline exoatmospheric defense being developed consists primarily of [deleted]. Exoatmospheric defense would provide a large defended footprint and thus could provide defense of [deleted].

Critical issues associated with exoatmospheric defense which must be resolved through demonstration include [deleted]. The BMDO is pursuing separate programs to resolve some of these issues. One such program is the Homing Overlay Experiment (HOE). During [deleted] scheduled flights is expected to demonstrate the [deleted] exoatmospheric homing and nonnuclear kill (NNK) of reentry vehicle. [deleted]. This is the first attempt ever made to intercept ICBM RVs with NNK devices.

The current exoatmospheric defense program is structured to validate the most critical technologies and is not yet in a prototype development phase.

SUMMARY

The Army must continue a vigorous BMD R&D program which will provide a BMD option for long-term survivability of the US ICBM force. The BMD program seeks a balance between two major objectives: first, the preservation of cost-effective defense options which can be developed and deployed rapidly to meet near-term objectives and which have a relatively low development risk; second, the maturation of advanced technology and systems concepts which can cost-effectively counter projected Soviet threat growth. Based on current planning and funding both objectives will be pursued.

The accelerated BMD program is designed to support a decision in July 1983 regarding US strategic deployment options. A comprehensive set of key tests and demonstrations at the subsystem level will be completed by [deleted] to ensure that the assessments of the options' effectiveness are valid and that deployment would be a low risk option. Key components of the interceptor, radar, and data processing subsystems will be demonstrated, including interceptor propulsion flight tests at White Sands Missile Range. It is also planned to complete tests to determine the capability of the components to operate in a stringent nuclear environment. Planning for production, siting, construction, logistics, operational concepts, etc., will also be pursued with the aim of ensuring the ability to reach IOC in [deleted] should a decision be made in July 1983 to deploy. Effort will also be made to exploit new and emerging technologies in order to improve the cost effectiveness and attractiveness of BMD systems, to guard against technological surprise by the Soviets, and to mature the technology associated with future system concepts.

Senator WARNER. That was a very good briefing.

What sort of policy review currently is underway, Secretary Hoeber, in the administration to assess whether or not [deleted].

Ms. HOEBER. There has been a proposal made by the Air Force to the EXCOM, which is chaired by Dr. DeLauer, to have a study done on that issue, what the long-term stability implications are. I do not know what the status of that proposal is. Do you, General Burke?

General BURKE. I think it is still underway.

Senator WARNER. It is what?

General BURKE. Still underway.

Ms. HOEBER. The Army will participate, as will the Air Force.

Senator WARNER. Do you know about the status of the preparations for the upcoming ABM Treaty review session with the Soviet Union?

Ms. HOEBER. No; I do not.

Senator WARNER. I think we need to get someone over here to address those questions.

Senator Levin, do you have any questions?

Senator LEVIN. Yes; I see the IOC for the BMD was [deleted]. And you were going to give us the other IOC's in the executive session. General, if you could do that, perhaps you could give us the IOC for the continuous air patrol.

General BURKE. I said the deep basing in the air mobile patrol would be, at best, the late 1980's. I would think 1990 would probably be the earliest for the air mobile.

Senator LEVIN. Now that we are in executive session, the IOC would be 1990, do you feel?

General BURKE. I would have said that in open session. General Tate had the reservation about his IOC, probably because his is a bit more real than mine. [Laughter.]

Senator LEVIN. So, you cannot give us any more information on IOC's of the other two systems in closed session than you could in open session?

General BURKE. No, sir, we are doing very preliminary work in that.

Senator LEVIN. OK. I believe I misunderstood.

If we decide to have a deep underground basing for the MX, will we shift from the Minuteman silos to the underground basing for the 40 that we would install?

General BURKE. That is a possibility. It would just have to be decided after we went there.

Senator LEVIN. Will that decision be made in the same timeframe as the basic decision on the permanent basing mode?

General BURKE. It could be, yes, sir.

Senator LEVIN. But we do not know that that decision would be made by March of 1983, is that it?

General BURKE. July of 1983 is the date that the Secretary of Defense owes you a report.

Senator LEVIN. That is right, July. We do not know whether he will decide the question of whether to switch the 40 missiles into the new permanent basing mode by July 1983, do we?

General BURKE. No, sir, he could or he could not.

On the subject of deep underground basing, Senator, may I add a point to a question you asked me earlier which I did not answer as completely as I should have?

We are looking at the D-5. You asked me if we were looking at any smaller missiles. For completeness I should have said that we are looking at the D-5 as part of the deep underground basing. To even look further downstream, we are doing some very preliminary work on an even more advanced ICBM than the MX, and it likely would be smaller.

Senator LEVIN. So, you are looking at the D-5 to serve as the missile for deep underground basing?

General BURKE. Yes.

Senator LEVIN. Are you looking at any other form of missile for the air mobile other than the one MX you are asking us to procure this year?

General BURKE. The MX is what is looked at.

Senator LEVIN. But the exact missile that you are asking us to procure with those exact dimensions and length is the same missile that you would use on the airborne?

General BURKE. Yes, sir.

Senator LEVIN. Let me take this up with the Chairman later in terms of whether we should ask the Secretary a question about the 40 missiles in the interim basing mode. It seems to me that is a critical question as to what his timeframe is for deciding whether he is going to move those from the interim to the permanent basing mode.

Then that decision, it would seem to me, ought to be part of his overall decision because the costs involved in that are relevent, I presume, aren't they?

General BURKE. They certainly can be.

Senator LEVIN. Do you have any idea how much it would cost, for instance, to move the missiles from the interim basing mode that you are proposing to the deep underground mode?

General BURKE. I don't think it would cost a whole lot to extract them and put them in there. I do not know what the deep underground mode would cost.

Senator LEVIN. You do not have any parameters on that cost?

General BURKE. No, sir.

Senator LEVIN. Could you tell us how much less capable the interim MX is than a survivable MX? Could you give us an adjective? Is it significantly less capable militarily, substantially less, somewhat less, slightly less?

General BURKE. As all of the capabilities of the permanent basing are very important in that survivability, there is significantly lower than what we would hope to find in any long-term basing mode.

Senator **Levin**. Can you give us a military overview as to overall whether this is significantly less?

Senator **Warner**. Could we establish the baseline of what survivable system are we making a comparison against?

Senator **Levin**. Any survivable system, to any survivable system.

General **Burke**. To a system that is 100 percent survivable.

Senator **Warner**. What is that?

General **Burke**. I don't know.

Senator **Warner**. I don't either.

General **Burke**. It is perfection.

Senator **Warner**. Then we really cannot compare it. Let's take the underground system, which is a comprehensible one, and it is realistic that you could tunnel it in, supposedly. That would have maybe an 80 percent survivability.

General **Burke**. Perhaps. But again it is a difficult comparison because it is survivable in a very slowly responding way. You attain your survivability by making it not quick in response. So, it is not the same. It is hard to make a comparison, but it would be more survivable.

Senator **Levin**. You cannot say that it is significantly better militarily if it is survivable?

General **Burke**. Oh, yes, sir. Clearly, survivability is an important military and, I should think, political goal for MX.

Senator **Levin**. Could you say, in all fairness, that a missile that is survivable is significantly better militarily than one that is not?

General **Burke**. Yes, sir, although, again, I don't think of survivability as an absolute. I think it is a shorthand and a dangerous one. There are no survivable systems.

Senator **Levin**. I am trying to just get a feel for how much better is a survivable system than the interim system. Is it significantly better or slightly better? Can you give us some feel for that?

General **Burke**. I think if we are able to obtain a permanent basing mode with a high degree of survivability—and I hope that we will be able to do just that—it would be a significantly better arrangement than one with a very relatively low survivability.

Senator **Levin**. In the interim system?

General **Burke**. Yes.

Senator **Levin**. Going back to the 100 missile figure again, is my memory correct that our plan is to have 100 MX missiles deployed and have 170 additional ones in storage? Were those the figures?

General **Burke**. One-hundred operational missiles. We actually would build 226, keeping the bulk of the residue for testing over the next 30 years.

Senator **Levin**. So, we would have 100 with 226 deployed?

General **Burke**. There would be 100 deployed, and 126 for which you would not buy warheads, presumably, but which you would test fire over time.

Senator **Levin**. Oh, I see.

Are you assuming that the 40 in the interim basing mode are part of that 100?

General **Burke**. Yes, sir.

Senator **Levin**. And you don't know whether the 40 will end up in permanent basing or not?

General **Burke**. I don't know if the 40 will end up in the selected longer term basing. I guess if we left them in the silos that would then become a permanent basing.

Senator **Levin**. You do not know whether the 40 would end up in our permanent basing mode that we select next year or not?

General **Burke**. No, sir.

Senator **Levin**. And you are not sure that we will even know that next year?

General **Burke**. No, sir, although we can.

Senator **Levin**. You might know it?

General **Burke**. Yes.

Senator **Levin**. Thank you.

Senator **Warner**. Thank you, Senator Levin.

Would an upgrading of the Minuteman III force to equip it with the air guidance system and Mark 12-A warhead accomplish the same strategic purposes envisioned for the MX?

General **Burke**. I do not think it would at all, Mr. Chairman. The long-term and ultimate objective of the MX is to provide a highly capable and survivable system. The MX in silos has been a waypoint to that desirable goal. The Minuteman with upgraded accuracy is a deadend solution.

Senator **Warner**. General Burke, are you giving any consideration to the proposals that were briefed to several of us—you were present at that time. I received one briefing which entailed launching missiles to orbit on warning as a means for providing for MX long-term survivability.

General **Burke**. Yes, sir, we have continued to look at that. General McCarthy has particularly done this in his individual time. Perhaps he can elaborate a little bit on what he has seen since we last talked.

General **McCarthy**. We have looked at that concept and we have reached a stage where a contractor who is seeking a contract is now negotiating with our ballistic missile office to work out the concept in greater detail. That discussion is ongoing at this particular time.

It would be a preliminary look at the concept to see whether it offers any attractiveness as a long-term solution.

Senator **Warner**. Secretary Hoeber, Generals, I thank you very much. This has been a longer session than we perhaps anticipated. Nevertheless, we have given members of the committee a very adequate opportunity to question you, and I thank you for your professional responses. There will be questions submitted for the record.

[Questions submitted, with answers supplied, follows:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

BMD MANAGEMENT RESPONSIBILITIES

Senator **Warner**. I have become increasingly concerned in recent years about the inherent impediment to totally integrated and efficient M-X/BMD development effort represented by a bifurcated management team. Would you address for the committee the compelling reasons which, in your views, argue in favor of retaining an independent Ballistic Missile Defense program in the Army instead of integrating it fully into the M-X development and management program?

To what degree might it be possible to realize economies through streamlined management of both programs by the Air Force?

Answer. I believe there are two arguments for continuing the current BMD management structure. First, Congress has mandated a July 1983 long-term M-X basing decision date. Since BMD is one of the candidates for long-term basing and there is little more than a year between now and then, a change in BMD management now would cause major disruption to the program at a critical time. Second, the Air Force has little continuous experience in BMD systems while the Army has over 20 years experience managing such programs. In terms of potential cost savings, I see no inherent reason why the Air Force would do a better BMD management job than the Army.

AIR FORCE SUPPORT FOR ABRV

Senator **Warner.** Dr. Keel, press and other sources have indicated that the Air Force was substantially less than pleased with the selection of the ABRV for the M-X. What, in fact, is the current Air Force position on this decision? Does the fact that you have awarded the development contract sole-source for the ABRV to AVCO mean that there will be no competition in the development of this reentry vehicle? Was this step taken in order to minimize the risk of schedule delay in the IOC of the M-X? How important do you believe such a procurement strategy to be to maintaining the scheduled IOC?

Answer. The Air Force advocated remaining with the MK 12A as the baseline MX Reentry Vehicle principally for cost and schedule reasons. Schedule problems were eased in two ways. First, restructuring of the M-X program in response to the President's decision of October 2, 1981, caused the system IOC to shift from July 1986 until later in the year. Secondly, it was determined that an arming and fuzing system being developed by the SANDIA Corporation could be used, allowing us to develop and procure ABRV in time to meet the late 1986 IOC.

The cost issue was mitigated when OSD provided the Air Force with funding for fiscal year 1983 and beyond. This was done concurrent with announcement of the decision. With removal of these two major concerns we support the ABRV and the benefits it brings to the M-X program.

It will be necessary to accomplish the development effort sole source. Present plans call for AVCO to develop the aero vehicle while the Sandia Corporation will develop the arming and fuzing subsystem. General Electric will provide backup in the arming and fuzing area. This strategy is essential to successful execution of the program. A delay until November of this year in beginning work (9 months required for competitive procurement process) would have slipped ABRV availability until October of 1987—a full year later than the planned M-X IOC.

As development of ABRV proceeds, we may find it possible to dual source some components. Also, it may be possible to institute competitive procurement once development work has been completed.

Senator **Warner.** Secretary Keel, The Committee has read in press accounts that the President will soon select F.E. Warren as the future site of the M-X interm basing. It is our understanding that the primary motivation for selecting this site is the calculation that the hardness value of the soil in that location surpasses that available at other Minuteman wings. Isn't it the case that given a two-on-one attack by Soviet warheads, the differences in probabilities of kill to be achieved at Grand Fork and F.E. Warren are virtually negligible?

Answer. On 31 December 1981, the Department of Defense announed that the intial deployment of the M-X missile would be in Minuteman silos. Following that decision, the Air Force was directed to conduct a narrowing process to determine the best location for the deployment. We are continuing that process in order to identify groups of 40 silos for M-X deployment.

A two-on-one attack upon silos of Minuteman hardness would produce levels of damage which would be comparable across the Minuteman force. If, however, a high value target such as the M-X were deployed in silos substantially less hard than those now indentified, the yields required to destroy the M-X could be cut in half. In the unlikely event the Soviets decide to attack, we would want to insure that we extract the highest possible price from their operational capabilities. Further, if silo basing (in conjunction with BMD) is included in long-term basing, hardness may be an important factor.

RELATIVE COST OF DEPLOYING THE MX AT VARIOUS MM III SITES

Senator **Warner.** Dr. Keel, have the relative costs associated with the interim deployment of forty M-X missiles at F. E. Warren and other Minuteman fields been developed? What are the costs of such a deployment at F. E. Warren compared with Grand Forks?

Answer. Our current deployment base facility cost estimates are generic in the sense that they could provide adequate support at any of the candidate support bases. Specific facility requirements or a specific based have not yet been developed. However, in general, the F. E. Warren AFB costs will probably be somewhat less than the Grand Forks AFB costs due to the relatively lower construction costs of the Cheyenne, Wyoming area.

STATUS OF THE PAR RADAR

Senator **Warner.** Secretary Keel, what is the status of the PAR radar in Grand Forks at this time? Does it perform a crucial role in the early warning and attack assessment of the United States?

Answer. The Perimeter Acquisition Radar Attack Characterization System (PARCS) radar in Concrete, North Dakota is operationally deployed as part of the Air Force Sea-Launched Ballistic Missile (SLBM) warning system.

The PARCS radar performs a critical role in early warning and attack assessment in that it provides [deleted] radar coverage of SLBM attacks [deleted] and accurate ICBM attack assessment information. Additionally, PARCS provides Space Detection and Tracking System (SPADATS) support in the form of survellance, tracking, reporting and space object identification of satellites.

ABRV SNM SAVINGS

Senator **Warner.** Dr. Keel, Yesterday, the Subcommittee heard from representatives of the Army and Navy about concerns for future availability of SNM to meet military requirements. Does the Air Force share this concern.

To what degree does the [deleted] SNM argue strongly in favor of the ABRV system?

To what degree will President Reagan's decision to add significant numbers of cruise missiles to the inventory compound the [deleted].

Answer. Of course we are concerned. All nuclear weapons programs are directly affected by the availability of Special Nuclear Materials (SNM).

Further, since the ABRV is a more efficient user of scarce [deleted] and will use less than the MK 12A would have, additional materials will be available for other programs.

The proposed addition of cruise missiles does not strain the SNM [deleted] as much as one might suspect because [deleted].

ABRV AND CPA

Senator **Warner.** Secretary Keel, is it your understanding that the decision to proceed with the advanced ballistic reentry vehicle was a function with the advanced ballistic reentry vehicle was a function of a determination on the part of senior defense officials to deploy the M-X missile in continuous patrol aircraft which would almost certainly result in a degradation of the accuracy of the missile? What in fact do you understand were the central considerations in OSD on this program?

Answer. The decision to proceed with the Advanced Ballistic Reentry Vehicle (ABRV) was not based on eventual M-X deployment in Continuous Patrol Aircraft but based on a much broader compelling set of reasons. Military effectiveness is a primary reason for choosing ABRV. The ABRV is the superior weapon when compared to the MK 12A. It has better accuracy, better hardening to nuclear effects and better all weather performance.

The yield can be increased to [deleted] without additional testing, providing a hedge against unforseen future problems with system accuracy or enemy target base. Safety is especially significant for M-X since two of the final basing candidates—Continuous Patrol Aircraft, and Defended Deceptive Basing—may involve some movement of M-X missiles.

The ABRV does include insensitive high explosive (IHE) making it a safer warhead than the MK 12A. The ABRV is a far more efficient user of special nuclear material, specifically [deleted]. Assuming 100 warheads at a yield of [deleted] each, selecting ABRV instead of the MK 12A will save [deleted] with a resultant cost savings of [deleted].

IMPACT OF A FAILURE TO FUND MX IN FISCAL YEAR 1983

Senator **Warner.** Would you provide for the record a detailed breakout of the impact on the initial operational capability of the M-X system and the consequent deterioration that would be expected in the strategic balance, for a variety of reduced levels of funding that might be considered by the Congress this year? Please start with a zeroing of the program in fiscal year 1983 and provide the funding levels that would be consistent with a three month, six month, nine month, one-year and two-year slip in the IOC.

ANSWER. Deletion of M-X funding in fiscal year 1983 would terminate the program and result in disbandment of the M-X contractor team and its industrial base. Assuming a restart in 1984, it would still require several years and substantial additional funds to reform a qualified contractor team and make up for lost development time. An IOC delay of 3-4 years would be likely.

A three month IOC slip is not feasible with adjusted funding. However, a six month to a one year slip would result from deletion of all procurement funding in fiscal year 1983. Additional reduction in RDT&E to $1.5 billion would result in about a two year IOC slip. As you suggest, further deterioration of the strategic balance would occur if M-X deployment is delayed.

TITAN RETIREMENTS

Senator WARNER. Secretary Keel, would you provide for the record a historical review of the discussions and planning associated with Titan retirement over the past 12 years. Was their retirement considered—or preferred—as a trade-off we were willing to make in exchange for concessions on the part of the Soviets in the SALT negotiations?

ANSWER. Over the years Titan II retirement has been considered on several occasions. In 1968 there was a tentative plan to begin to retire the Titan IIs beginning in 1972. Another proposal would have retired the Titan IIs starting in 1974. These proposals were cost-saving measures, but were held in abeyance due, in part, to SALT considerations.

In 1969 President Johnson imposed a freeze on strategic force levels prior to beginning the SALT talks. In 1972 the Interim Offensive Agreement established a five-year upper limit freeze on strategic systems. Keeping the Titan II system operational throughout the SALT I and II negotiating periods was consistent with maintaining as strong a negotiating position as possible. During the SALT process, Titan IIs, along with other U.S. systems, were considered among the forces negotiable for obtaining concessions from the Soviets.

The recent decision by the Administration to retire the Titan IIs as part of the overall strategic modernization program will free up critical resources which can be applied to fielding newer, more capable and cost-effective systems. Rather than weakening the U.S. bargaining position in the START process, the commitment to modernization will permit the U.S. to negotiate from a position of increased strength.

IMPACT OF CANCELLATION OF THE MX

Senator WARNER. Secretary Keel, what would you anticipate the impact of a cancellation of the MX or the decision simply to defer its production to be on our arms control negotiating position?

ANSWER. MX plays a crucial role in both our strategic force modernization and arms control negotiation programs. The Soviets are likely to resist limitations or reductions in areas where the USSR has a substantial advantage (e.g. ICBMs) unless they are convinced that the U.S. will offset these Soviet advantages through substantive strategic modernization and force development programs. In this respect, the MX program will be a key determinant of U.S. negotiating leverage. Strategic force modernization through the production and deployment of the MX will establish the credibility of U.S. determination, play a crucial role in re-establishing the essential nuclear balance with the Soviet Union, and will directly impact how much the Soviets may be willing to ultimately concede in arms control negotiations. Cancellation or production deferment could seriously undermine our arms control negotiating position.

ROLE OF MX IN AN INTERIM BASING MODE

Senator WARNER. Would you comment on what the role of MX in an interim basing mode will play for strategic stability?

What impact do you envision such a deployment will have on Soviet perceptions of U.S. first-strike capabilities?

Do you anticipate that their response will be to move in the direction of building more survivability into their strategic forces or to put a more delicate hair-trigger on the strategic balance?

ANSWER. Near-term silo basing of M-X will increase overall strategic stability. It will begin to place at risk systems and command structure the Soviets view as critical to their war winning strategy. A lowered Soviet perception of its ability to fight and win nuclear conflict increases stability. In addition, silo deployment of M-X provides leverage for pursuit of meaningful and stable arms reductions. While M-X silo basing significantly increases strategic stability, the level of stability we ultimately seek requires the survivability being pursued in the President's long-term M-X basing program.

Any improved, rapid, hard-target kill capability will probably sharpen Soviet perceptions of a U.S. first strike, even though deployment of M-X in silos would fall far short of that needed to disarm the Soviet Union.

With regard to potential Soviet reactions to M-X silo deployment, [deleted]. They could also refine their capability to launch their silo-based missile force on tactical warning.

ABRV COSTS

Senator WARNER. What do you estimate will be the costs to the Air Force associated with developing the ABRV? What is your assessment of the savings that might be achieved by the Department of Energy in Special Nuclear Materials (SNM) production as a consequence of selection of the low-yield ABRV option?

ANSWER. The cost to the Air Force for ABRV will be an additional [deleted] (fiscal year 1982$). This cost will be offset to a large extent by savings in Special Nuclear Materials. At an equivalent yield of [deleted] the ABRV uses considerably less quantity of scarce [deleted] than does the MK 12A. Across a force of some 1050 warheads this equates to an approximate savings of [deleted] (fiscal year 1982$).

Further, if we continued with the MK 12A program, an improved fuze would have been included at an additional cost of some [deleted] (fiscal year 1982$). Considered together these costs tend to balance out the added cost of ABRV.

RAILROAD BASING OF MX

Senator WARNER. General Burke, as you know, the Air Force has considered the idea of railroad basing of ICBM's off-and-on for a good many years. Recently, there has been a resurgence of interest in this as a means of providing a survivable basing system for the M-X.

Would you provide for the record a detailed assessment of the possibilities America's railroad system might offer for survivably basing a missile the size of M-X?

I would like to ask on behalf of Senator Tower that you review an analysis of this question submitted to him by Mr. John Murray in the form of a letter to Congressman Cooper Evans. Would you provide detailed responses to it for the record.

ANSWER. Mr. Murray's letter to Senator Tower refers to an Office of Technology Assessment (OTA) report sponsored by the Congressional Technology Assessment Board, Senator Stevens Chairman and Congressman Udall, Vice Chairman. Rather than attempting to deduce from the OTA report the data behind the analysis, I would comment that OTA's conclusions are similar to our conclusions based on previous Air Force studies.

Previous Air Force studies indicated that public safety, safety of missiles, and system survivability to a variety of potential threats posed severe problems for the government. In fact, we, like OTA, also used the term "insurmountable problems" which was perhaps a bit strong. A short summary of our previous rail mobile evaluation is attached.

I have one additional comment and it is that we are currently reviewing our previous rail mobile evaluation and looking at every possible new aspect of the rail mobile concept. Within approximately 3 months we should have a preliminary assessment of whether we should continue to carry rail mobile as an option for ICBM deployment. During the course of our investigation we will discuss the matter with Mr. Murray, OTA, and others.

CONTRIBUTION TO BMD TO MX SURVIVABILITY

Senator WARNER. General Burke, let me make sure the record is clear; you believe that ballistic missile defense can make an important contribution to M-X survivability in a deceptive basing scheme especially if the Soviet threat should grow, but that it is not essential to the total success of such a system.

BMD is essential, however, to making a fixed-silo basing of M-X even somewhat survivable?

Answer. There are serious unresolved political, treaty, and technical issues involved with commitment to Ballistic Missile Defense. Therefore, I do not believe BMD of present fixed silos is as attractive an option as an M-X basing mode which uses deception as a basic defensive multiplier and has the BMD option to carry that multiplier to very high levels if necessary.

PROS AND CONS OF ABRV SYSTEM

Senator **Warner.** General Burke, as you see it, what are the pros and cons of the decision to equip the M-X missile with the ABRV warhead?

Answer. The ABRV provides several advantages over the MK 12A. For example:

1. ABRV is an advanced technology reentry vehicle with improved accuracy, enhanced all weather capability and increased hardness against nuclear effects.
2. ABRV has growth potential for a higher yield warhead which will provide an important hedge against future Soviet initiatives.
3. The ABRV warhead will incorporate modern safety features which will reduce even further the already very small chances of a nuclear accident. Some modification of the W 78 (MK 12A warhead) would have been required to incorporate these features. Additional underground nuclear testing would have been required to establish the feasibility of this modification.
4. The ABRV will use significantly less nuclear materials than the MK 12A at equivalent yield. These savings, combined with the cost that would have been required to upgrade the MK 12A fuze, produce offsets that tend to balance out cost to the government of shifting to ABRV.
5. And finally, the ABRV provides an important element of diversity and advanced capability in the MIRVed ICBM force.

Of course we will be on a tight schedule with ABRV, but we are confident that it can be developed and procured in time to meet a late 1986 M-X IOC with acceptable schedule risks.

SCHEDULE AND PERFORMANCE RISKS OF THE MX CAUSED BY SELECTION OF ABRV

Senator **Warner.** Are you concerned about schedule and performance risks of the M-X caused by the selected of the ABRV? Would the selection of a modified MK 12A, involving the new potluck radar force and the sensitive high explosive, have posed similar risks?

Answer. We believe that the ABRV can be developed and procured in time to meet the late 1986 M-X IOC with moderate schedule risk.

Incorporating an improved fuze and insensitive high explosive (IHE) into the MK 12A would have posed similar risks. In fact, an additional underground nuclear test would be required to provide baseline data for an IHE warhead for the Mark 12A. Additional tests might be needed prior to certification.

LEGISLATIVE HISTORY OF MX

Senator **Warner.** General Burke, would you discuss for the committee the legislative history concerning basing of the M-X missile with regard to Congressional limitations on fixed silo basing of this system?

Answer. Three key pre-fiscal year 1982 Congressional restrictions against silo basing (the first two explicit, the third implicit) follow.

1. Authorization Conference Report (fiscal year 1977). "The rationale behind the development of a new missile system (M-X) is to provide a land based survivable strategic force. The development of an alternate basing mode as opposed to a fixed or silo based mode is the key element in insuring this survivable force. The conferees are in agreement that providing a survivable system should be the only purpose of this effort, that the design of this system should not be constrained for silo basing; that none of this program's funds shall be expended in fixed or silo basing for M-X . . ."
2. House Armed Services Committee Report (fiscal year 1979 Supplemental). ". . . the committee has provided for an expressioin of the sense of Congress that maintaining a survivable land-based intercontinental ballistic missile system is vital to the security of the United States . . . the committee will not consider under any condition an approach which develops a new M-X missile but provides no basing mode other than the current fixed Minuteman silos."
3. Defense Authorization Act (fiscal year 1981). ". . . the Congress finds a survivable land-based Intercontinental Ballistic Missile (ICBM) system is vital to the security of the United States . . . and that timely deployment of a new basing mode is essential . . . it is, therefore, the purpose of this section to commit the Congress to

the development and deployment of the M-X missile system, consisting of 200 missiles and 4,600 hardened shelters, and to insure that deployment of the entire M-X system is carried out as soon as practicable . . . achieve an initial operational capability of such missile and basing mode not later than December 31, 1986."

The above restrictions were levied prior to President Reagan's October 2, 1981 announcement to deploy the first M-X missiles in silos. No Congressional restriction since that time has been levied against silo basing. Rather, the Congress funded the fiscal year 1982 request for silo basing, although the Nunn-Cohen Amendment to the fiscal year 1982 DoD Appropriations Bill questioned super hardening of silos for the near-term deployment of M-X.

ADMINISTRATION POSITION ON MX BASING

Senator WARNER. Secretary Keel, is it the position of the Administration that such limitations applied to plans for long-term basing of the M-X and that the President's program for deploying it in Minuteman silos on an interim basis until a satisfactory long-term basing solution is developed, is consistent with Congressional direction?

ANSWER. We believe the M-X program is totally consistent with Congressional direction. The President's ICBM Modernization Plan calls for the permanent basing of M-X in a survivable configuration. Since the Multiple Protective Shelter (MPS) basing mode was cancelled, silo basing is an effective alternative in providing significant improvement in U.S. strategic capability by 1986. The President believes that this first step is necessary to show U.S. resolve in redressing a substantial Soviet advantage in ICBM capabilities, and through the earliest deployment of M-X the U.S. will gain important negotiating leverage during potential crises and in future strategic arms reduction talks. To date, the Congress has generally supported this effort as they have defeated attempts during the fiscal year 1982 Appropriations process in both the House (Addabbo Amendment lost 264-139) and the Senate (Pryor Amendment lost 60-35) to delete funding for the President's M-X program.

ABRV VERSUS MK 12A EFFECTIVENESS

Senator WARNER. General Burke, General Davis, in his appearance before this Committee, said that they're hearing a number of advantages to the ABRV from a military point of view over the MK 12A. Others have contended, however, that these two weapons have essentially equivalent effectiveness against the set of Soviet targets in the SIOP at the expected M-X accuracy. Would you clarify this issue for us?

ANSWER. It is true that at equivalent yield, the ABRV and the MK 12A have similar effectiveness. Further, at the programmed M-X CEP of [deleted] a yield of [deleted] is adequate against even very hard targets.

The Strategic Air Command has consistently supported the ABRV at a yield of [deleted]. They believe that the higher yield helps to overcome targeting uncertainties such as hardness, location and possible accuracy problems.

The ABRV does, indeed, provide a hedge in this regard. Should M-X accuracy degrade, or should Soviet target hardness increase, the ABRV can be increased in yield. For example, if M-X accuracy were to degrade into the [deleted] range, increasing yield could maintain target damage at acceptable levels.

SIGNIFICANCE OF MX TO STRATEGIC BACKDROP

Senator WARNER. General Burke, would an upgrading of the Minuteman III force to equip it with AIRS guidance systems and MK-12A warheads accomplish the same strategic purposes envisioned for MX? Would such a retrofitting, in the absence of MX, result in a situation of greater or lesser strategic stability?

Would it encourage the Soviets to achieve greater survivability for their strategic forces or simply to posture them in a way more conducive to a first strike? What would the costs be of performing such a retrofit on the Minuteman III force?

ANSWER. While AIRS guidance and additional MK-12A RVs could improve MM III hard target kill potential, such improvements would not accomplish the same strategic purposes as near-term silo deployment of M-X. The strategic situation would be less stable if MM III improvements were pursued in lieu of near-term M-X silo basing.

M-X silo deployment will not only provide improved hard target kill; it will add additional ICBM warheads and improve overall SIOP force application. Because it carries ans added weight penalty for AIRS guidance and additional MK-12As, as improved NM III would decrease SIOP application efficiency. M-X silo deployment is a far more visible indication of U.S. resolve to meet the Soviet strategic challenge. It complements our efforts to deploy modernized intermediate range nuclear forces in Europe. In addition, M-X silo deployment can be expanded as required, providing leverage to convince the Soviets to seriously consider meaningful arms reductions. Finally, deployment of M-X in silos hedges against possible rapid degradation of the aging MM system. As they are replaced by M-X, MM will provide additional test assets to preserve high confidence to accuracy and reliability of remaining MM. If reliability problems should develop in spite of having additional MM test assets, MX boosters could fill the void.

With regard to possible Soviet reactions, the Soviet ICBM force is currently conceivably postured for a first strike against U.S. forces. Increasing the capability of the Minuteman III force to destroy Soviet ICBM silos would probably not change that posture appreciably. However, any option which improves U.S. ICBM hard target kill potential would encourage the Soviets to increase their emphasis on development of small, solid propellant mobile ICBM's and further improve the survival potential of their SSBN/SLBM force.

Current costs estimates for AIRS and MK-12A improvements to MM III are approximately $12.4B (then-year dollars). Adding MK-12A RVs to all but 100 MM IIIs [deleted] would cost about $370M exclusive of DOE cost for the warheads. Adding AIRS to 600 MM IIIs is currently estimated at $12B with a 1985 IOC and would require six years to complete the program.

IMPROVED PROSPECTS FOR BMD UNDER THE AIR FORCE

Senator **Warner**. General Burke, in your personal, professional judgment, is the likelihood of achieving an effective and reliable Ballistic Missile Defense system fully integrated into and compatible with an M-X deployment scheme such as the defended, deceptive basing options now in consideration, if this program is managed by the Air Force as part of an M-X system development effort?

Answer. I believe that a fully-compatible Ballistic Missile Defense system can be designed by either Service. A break in the BMD program now, such as transition to the Air Force, however, would make early IOC more challenging and would make a July 1983 decision considerably more difficult, if not impossible.

Potential system savings might also be somewhat uncertain since the Air Force would have to organize an ICBM defense development System Program Office, with associated start-up costs.

BMD FUNDING

Senator **Warner**. What is your projection of the amount that would be required in fiscal year 1984 and 1985 to support a [deleted] BMD system IOC—recognizing that this is not an officially approved funding wedge. Simply put, what would it take to do the job?

General **Tate**. The Baseline Terminal Defense System (previously LoAD) is the BMD system being developed to provide the [deleted] IOC. The funding projection for this BMD system will be dependent upon the basing configuration in which it is deployed. The MX basing mode selected will influence BMD system requirements and, therefore, corresponding outyear costs. At this time, the BMD program has funding figures only for RDTE and only through fiscal year 1983.

DISCRIMINATION

Senator **Warner**. Will the Homing Overlay Experiment test this summer require the system to discriminate or will it simply test the ability of the homing vehicle to attack a target? How far away are we from getting a validation of this system's capabilities for discrimination?

General **Tate**. [Deleted].

A complementary effort to HOE is the BMD Designating Optical Tracker (DOT) program which has the objective of [deleted]. Four DOT missions have been conducted to date and all were successful. The DOT program has [deleted].

The HOE and DOT programs will [deleted].

IMPACT OF A BMD DEPLOYMENT DECISION AT F. E. WARREN

Senator **Warner**. What would be the impact under the terms of the 1972 ABM Treaty on the PAR radar if the Reagan administration were to decide to deploy a ballistic missile defense system at F. E. Warren? Would the US be able to maintain the use of the PAR system for non-BMD purposes without achieving a modification of the ABM agreement from the Soviets should the US decide to defend F. E. Warren?

General **Tate**. Under the provisions of the ABM Treaty, the US is allowed only one ABM site. The choice was to put Safeguard at Grand Forks, ND, to defend Minuteman. The PAR radar was a part of the Safeguard system at Grant Forks. Should the US decide to deploy a BMD system at F. E. Warren the US would have to either modify or withdraw from the ABM Treaty since the Treaty makes no provisions for switching defensive sites between ICBM fields. [Deleted].

TWO-PHASED BMD

Senator **Warner**. Given the suspected preparedness of the Soviet Union to deploy a comprehensive ballistic missile defense system in the absence of the ABM Treaty, would it not make better sense to undertake at least an initial defense of the M-X by the use of a system employing the PARCS Radar and a deployment of such missiles at Grand Forks? In what timeframe could such a system be operational?

General **Tate**. The PARCS is an early warning/attack assessment sensor and is not configured to perform the functions needed to guide BMD interceptors for terminal engagement of threatening reenty vehicles. Even when initially deployed as part of Safeguard, it required the Missile Site Radar (MSR) for missile guidance. The current Baseline Terminal Defense system program provides for the most rapid development of BMD components to perform the necessary functions of search, track, discrimination, interceptor guidance, and intercept of the threatening reentry vehicle. The PARCS could be used to alert the Baseline Terminal Defense System as part of the U.S. early warning system. The Baseline Terminal Defense System is currently an accelerated development effort and will provide the option for an IOC in [deleted] it is the only cost-effective BMD system with sufficient maturity to meet a [deleted] IOC.

FORWARD ACQUISITION SYSTEM

Senator **Warner**. Ms. Hoeber and General Tate, What is the funding profile for the exoatmospheric ballistic missile defense program for fiscal year 1983 and the out years?

In view of the significant advantage that can be realized from achieving a leveraged defense, ideally consisting of deceptively-based offensive and defensive systems and endo- and exoatmospheric BMD capabilities, shouldn't we be doing more to develop and test an exo system such as that envisioned for the forward acquisition system (FAS) vis-a-vis the outlays being proposed for endoatmospheric defense?

Ms. **Hoeber**. It would be desirable, ideally, [deleted] all dictate the need for continued emphasis on the endoatmospheric baseline terminal defense system.

General **Tate**. The current exoatmospheric funding profile is as follows:

Funding

	Millions
Fiscal year 1983	$111
Fiscal year 1984	[Deleted]

[Deleted.] The increases required for that program are as follows:

Funding

	Millions
Fiscal year 1983	[Deleted]
Fiscal year 1984	[Deleted]

The Forward Acquisition System (FAS) is an essential element of the BMD exoatmospheric system. Indeed, we should be doing more to develop and test an exoatmospheric system. There are numerous advantages to a nonnuclear exoatmospheric defense capability, including the benefits from a nonnuclear system (no nuclear release requirement, greater public acceptance, ease of transport and deployment, no self-inflicted nuclear blackout, flexibility of system siting, etc.) and the advantage of intercepting the threat at long range and high above the atmosphere. However, based on the need to provide the option for a BMD deployment capability by [deleted] (to support the Administration's strategic modernization plan), it is necessary to continue high funding priority for the endoatmospheric Baseline Terminal Defense System which is the only cost-effective BMD system with sufficient maturity to meet a [deleted] IOC date. [Deleted.]

IMPACT ON ABM TREATY OF FISCAL YEAR 1983 REQUEST

Senator **Warner**. Are you constrained by the 1972 SALT I/ABM Treaties or any other measure to refrain from integration and testing of a full-up Ballistic Missile Defense system? Is the fiscal year 1983 request in conformity with such constraints?

General **Tate**. [Deleted.]

BMD STUDIES

Senator **Warner**. The authorization conference report on the fiscal year 1981 Defense Bill directed that two studies be provided to address key questions the Congress has about Ballistic Missile Defense: (1) What is the comprehensive plan we should be pursuing for BMD and (2) what are the Soviets up to in this area? The committee finally received the latter in November, 1981—more than nine months past the requested delivery date. The former has still not been received. Where does this report stand at the moment and how soon can we expect to review it?

Ms. **Hoeber**. The Office of the Secretary of Defense is completing the BMD report and anticipates delivering it to Congress this month. The preparation of this report has been delayed due to an extensive review of the BMD program this past summer by the Reagan administration and by the strategic decisions made in October 1981.

BASING OPTIONS

Senator **Warner**. I was struck by your comment in your opening remarks that "BMD is under consideration as the third option for long-term basing of the M-X". As you may know this committee has expressed its interest in the long-term option for M-X survivable basing which takes advantage of the high leverage possible with a system which combines BMD with Deceptive Deployment of either offensive missiles, defensive components or both. Is this option receiving full and fair attention in the testing review now underway, both from the Army and the Air Force?

Ms. **Hoeber**. [deleted.] There is currently an integrated effort underway between the Army's Ballistic Misslie Defense System Command (BMDSCOM) and the Air Force Ballistic Missile Office (BMO) to investigate options for long-term basing of M-X. [deleted] defense of deceptively based M-X missiles. The goal of the study is to define and recommend the most cost effective modes available for the long-term basing of the M-X. The Army also maintains a continuing dialog with the Air Force to assure that the necessary coordination on all options is conducted. This permits the Army to proceed with the development of a flexible BMD system design capable of defending ICBMs in either fixed or deceptive basing modes under consideration. These programs are also being reviewed by OSD Strategic Program Executive Committee which is chaired by Dr. DeLauer.

BMD MANAGEMENT RESPONSIBILITIES

Senator **Warner**. I have become increasingly concerned in recent years about the inherent impediment to totally integrated and efficient MX/BMD development effort represented by a biforcated management team. Would you address for the committee the compelling reasons, in your views, that argue in favor of retaining an independent ballistic missile defense program in the Army instead of integrating it fully into the M-X development and management program? To what degree might it be possible to realize economies through streamlined management of both programs by the Air Force?

Ms. **Hoeber**. There are a number of compelling reasons to retain an independent BMD program within the Army.

The Army has successfully managed the BMD research and development (R&D) effort since its inception in 1955. The nucleus of this country's expertise in BMD technology resides within the Army. The BMD program has matured from the initial demonstration that BMD was feasible, through the Safeguard deployment, to more recently being one of three strategic options to enhance ICBM force survivability. Current BMD R&D efforts are reaching fruition and the potential for effective BMD systems has never been greater, nor the need more critical to proceed without interruption.

In contrast, the Air Force does not have the BMD experience and technical knowledge to assume vigorous management of the program immediately and those capabilities cannot be acquired overnight. It could be a counter-productive effort to put the strategic offense and defense role under the management agency that is the strategic offense proponent since objectivity could be lost. Transfer of the BMD program could result in a drastic disruption in research and development efforts at the very time the program is being accelerated. In fact, the U.S. is already playing catch-up in the BMD systems area ever since BMD prototyping was denied during the late 1970's. It has been necessary for the U.S. to rebuild program capability and momentum while the Soviets have steadily maintained a complete systems-level program, [deleted] with a deployed system. The recently announced strategic modernization program calls for national decisions on BMD to be made in July 1983. BMD is a serious option in the Administration's new strategic policy and the Army is giving the BMD program intensive management and attention in order to meet that obligation.

It would appear that few economies could be realized through a single program management structure. The size and complexity of the programs and the different technical skills required for the efficient and effective management of each do not lend themselves to consolidation. Even in the areas of such common functions as budgeting and contracting few savings would appear to be possible since size of the program being administered by and large dictates the size of the staff required. With contractor teams in place and contractual obligations established, serious, and potentially costly, disruptions could occur in any attempt to realign management structures.

The Army BMD and Air Force ICBM programs are being given overall management as interrelated parts of a total package. In order to ensure an integrated and balanced defense/offense system which takes best advantage of the options available while rightfully maintaining individual program management at the respective Service level, DOD is coordinating the implementation of the total strategic modernization effort. An OSD forum, the Executive Committee (EXCOM), chaired by the Under Secretary of Defense for Research and Engineering and having senior leadership representation from OSD and the Services, ensures a coordinated and integrated effort. The EXCOM closely monitors the direction of both programs with the purpose of achieving the necessary economies in these vital national programs.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

AIR FORCE POSITION ON CHOICE OF MK 12A VERSUS ABRV

Senator THURMOND. Before the Office of the Secretary of Defense (OSD) established the fiscal year 1983 Budget request, what was the Air Force's position on the choice of MK 12A over ABRV for the M-X programs? What was the basis of the Air Force's reclama for MK 12A after the OSD decision in favor of ABRV?

ANSWER. The Air Force supported MK 12A as the baseline M-X reentry vehicle prior to the OSD decision to proceed with development of the ABRV. The basis for this support was schedule and cost. When initially proposed, ABRV would not have been ready until some 18 months following IOC. Time required to develop the arming and fuzing system was the cause of this delay. Further the Air Force budget did not contain funds for ABRV.

In October of last year, the schedule problem was eased when the Ballistic Missile Office determined that an arming and fuzing system being developed by the Sandia Corporation could be used, allowing us to develop and procure the ABRV in time to meet the late 1986 M-X IOC.

As for cost, funding for fiscal year 1983 and beyond was provided to the Air Force at the time the decision to proceed with ABRV was announced. It was determined at the Department of Defense level that the savings to the taxpayers through conservation of fissionable materials, when added to the additional military capability provided, made the ABRV well worth the additional cost. A supplemental appropriations request for $57 million has been proposed to cover fiscal year 1982 ABRV work.

As a result, the Air Force did not submit a reclama to OSD in response to the ABRV decision.

COST AND SCHEDULE RISK IMPLICATIONS ON AIR FORCE'S CHOICE OF MK 12A VERSUS ABRV FOR MX

Senator THURMOND. What were the cost and schedule risk implications of the Air Force's choice and position at that time?

ANSWER. The MK 12A would have cost approximately $1 billion (fiscal year 1982$). As the baseline vehicle did not include an improved arming and fuzing system, tasks consisted primarily of adapting it mechanically and electrically to MX. Both cost and schedule risks in accomplishing these tasks were judged to be low.

AF TARGETING STUDIES

Senator THURMOND. Have the AF targeting studies shown that the lighter weight and resulting increased target range/footprint capability of the MK 12A are equally as important as the increased yield potentially available in ABRV, such that the overall military effectiveness is roughly equivalent?

ANSWER. We know of no studies that conclude that the range or footprint capability of MX with MK 12A offers any substantial advantage vis-a-vis the capability of MX with the ABRV from the alternative M-X deployment sites presently under consideration.

There were earlier studies that led to a slight preference for lighter MK 12A from potential M-X deployment areas in the Southwest United States. That work has been overcome by events. However, we currently have no plans for Southwest deployment of M-X. In addition, the MK 12A would probably be deployed with Insensitive High Explosive (IHE), thereby decreasing the difference between its weight and that of the ABRV.

IS ABRV INFERIOR TO THE MK 12A?

Senator THURMOND. Is it not true that in order to save critical nuclear material, the ABRV would have to be deployed at a reduced yield. At that reduced yield is not the ABRV inferior to the MK 12A considering the MK 12A's lighter weight and improved targeting footprint against the enemy target system.

ANSWER. Warheads for both ABRV and MK 12A were being planned at a yield of [deleted]. System accuracy is the key element in weapon effectiveness and at the programmed M-X CEP of [deleted] weapon achieves sufficient levels of damage—additional yield is not required.

As for targeting efficiency, increased range and footprint are important only if they lead to a real increase in military capability. Analysis has shown that range and footprint of the M-X when loaded with the heavier ABRV is more than sufficient to cover the Soviet/Warsaw Pact target base. Additionally, these results have shown that more than [deleted] against the Soviet/Warsaw Pact target base. This allows us to conclude that there are no meaningful differences between the targeting efficiency of the MK 12A and ABRV.

The only real discriminant in military utility comes from the difference in the maximum possible yield between the two RVs. Should M-X accuracy be less than currently envisioned or should characteristics of the target structure change, the ABRV provides a hedge for preserving military effectiveness through increased weapon yield.

ARGUMENTS IN SUPPORT OF MK 12A FOR THE MX

Senator THURMOND. What arguments did the AF use at the Defense Review Board meeting in supporting the MK 12A for the M-X? Before the DOD made the decision in favor of ABRV, the AF objected on grounds that at least a one-year schedule slip in M-X IOC was probable. Just how comfortable does the AF feel today about the ability of ABRV to meet the current M-X schedule (development and deployment)?

ANSWER. The Air Force advocated remaining with the MK 12A as the baseline M-X Reentry Vehicle principally for cost and schedule reasons. Schedule problems were eased in two ways. First, restructuring of the M-X program in response to the President's decision of October 2, 1981 caused the system IOC to shift from July 1986 until later in the year. Secondly, it was determined that an arming and fuzing system being developed by the Sandia Corporation could be used, allowing us to develop and procure ABRV in time to meet the late 1986 M-X IOC.

As a result, moderate schedule risk is incurred as compared to relatively low schedule risk which would have been the case with the baseline MK 12A program. Of course modification of the baseline MK 12A to include insensitive high explosive in the warhead and to add an improved arming and fuzing system would have increased MK 12A schedule risk to a level comparable with that of ABRV.

Since major schedule concerns had been resolved at the time the DRB met, cost was a major factor in their deliberations. The Air Force budget at that time did not include funding for ABRV. This situation was accommodated by adjustments to the President's budget submission and through inclusion of fiscal year 1982 ABRV requirements in the Department's Supplemental Appropriations Request.

With removal of these two major concerns, the Air Force supports the ABRV and the benefits it brings to the M-X program.

ABRV WARHEAD SELECTION

Senator THURMOND. Staff analysis shows concern that the ABRV warhead selection may be sensitive to the selection of the M-X basing mode. Various warhead specialists believe the ABRV warhead mounting to be more sensitive to any horizontal basing mode (such as MPS or Air Launch) than the hard point MK 12A mounting. Was it not premature to select ABRV before the basing mode has been finalized, thereby adding additional constraints to an already difficult basing problem?

ANSWER. ABRV will be capable of performing in all basing modes being considered, including those in which the missile would be in a horizontal position.

COMPENSATING ADVANTAGES OF THE MK 12A

Senator THURMOND. We understand that although the M-X missile carries one fewer ABRV's than MK 12A's the ABRV, if produced at the maximum possible yield using more [deleted] than the MK 12A could offer some offset for substantial accuracy degradation of the M-X missile. It is not true that the compensating advantages of the MK 12A that is lighter weight and better targeting footprint, offer an equivalent hedge in overall effectiveness unless the M-X accuracy is so bad that potential yield differences have little effect on system performance.

ANSWER. Theoretically, the M-X could carry an additional MK 12A for any maximum ABRV loading because the MK 12A is lighter. However, the weight of the RVs is not the only issue. The M-X missile can carry up to 12 of either type RV without significant performance limitations. More than 12 RVs of either type are not feasible with the current missile.

For the present, the argument becomes academic, however, because SALT constraints limit M-X loading to ten reentry vehicles, and we have continued to abide by these constraints. Further, our studies conclude that there are no meaningful differences between the targeting efficiency of the MK 12A and ABRV even though the ABRV is heavier.

The primary difference in military utility comes from the difference in maximum possible yield between the two RVs. Should M-X accuracy be less than currently envisioned or should characteristics of the target structure change, the ABRV provides a significant hedge for preserving military effectiveness through increased yield that the MK 12A does not. Also, for any significant amount of [deleted], the ABRV will have a significantly greater yield.

AIR MOBILE MX BASING CONFIGURATION

Senator THURMOND. It has been suggested that the maximum yield ABRV would be used as a hedge against probable inaccuracies of an air mobile M-X basing configuration. Since the air mobile M-X requires in-flight, mid-course correction by the GPS satellite, would not both MK 12A and ABRV be equally effective and would you then not need the ABRV maximum yield? If the GPS were not operating, we understand that the missile accuracy degrades so much that higher yield potential is of little benefit or value.

ANSWER. The hedge provided by the increased warhead yield would be common to both air launched and ground launched M-X. You are correct in that if M-X were to be air launched, some form of guidance update would be required to obtain accuracies in the [deleted] range programmed for M-X. At this CEP, performance of either MK 12A or ABRV at equivalent yield would be essentially the same. Also, there is little to be gained from upgrading yield at this accuracy.

Should accuracy degrade to the [deleted] foot range, however, then increasing yeild could provide a useful hedge. ABRV provides this flexibility while MK 12A does not.

EMPHASIS ON PROGRAM RISK FOR ABRV

Senator THURMOND. Ignoring the one billion dollars cost penalty for ABRV and possibly a one-year schedule slip for the moment, how much emphasis has been given to program risk? That is, what credit if any has been given to the operational MK 12A with known cost, schedule, weight and other performance parameters and with over 400 flight tests versus an ABRV paper design with three technology flights of a substantially different configuration. Does not schedule risk really translate into a high risk of cost overruns?

ANSWER. Total cost of the Government tends to balance out with ABRV. Further, we believe that ABRV can be developed and procured in time to meet a late 1986 M–X IOC within planned costs.

Schedule risk with ABRV is considered to be moderate, but manageable. MK 12A schedule risk was judged to be low; however, the configuration that was contained in the M–X baseline did not include an improved fuze. While it is true that MK 12A has been developed and procured for Minuteman III, the version planned for M–X would have had some differences. Additions such as an improved fuze and insensitive high explosive warhead would have required changes from the Minuteman III configuration with the need for attendant reverification of prior test results.

Additionally, the high number of tests you cite must include both MK 12 and MK 12A data. [Deleted.]

ABRV PROGRAM COST

Senator THURMOND. We have heard estimates that the ABRV program cost would be in the neighborhood of $1 billion additional above the MK 12A costs in constant 1981 dollars and that the risk of cost overrun to the M–X program might be significant. Do the estimates confirm this R&D cost situation?

ANSWER. The ABRV cost increment over the MK 12A baseline is approximately $881 million in fiscal year 1982 constant dollars. Cost and technical risk are judged to be low while schedule risk is moderate. After carefully assessing these factors, we are confident that ABRV can be developed and procured in time to meet the late 1986 M–X IOC. We also believe that this can be done within planned costs.

You should know that there are factors which tend to balance out cost to the government of shifting to ABRV. First, the ABRV uses significantly less nuclear materials than the MK 12A at equivalent yield. This produces savings of approximately $500 million (fiscal year 1982$). Secondly, we would have been required to add an improved fuze to the MK 12A if it had been retained as the M–X baseline system. This would have increased costs by approximately $259 million (fiscal year 1982$).

DIVERSITY OF WARHEADS IN THE ICBM FORCE

Senator THURMOND. Some in DOD have suggested that diversity of warheads in the ICBM force is a valid reason for the additional $1 billion cost. Is it not true that redundancy is only an issue if you are concerned about the design integrity and quality of the warheads currently deployed in the Minuteman Force, or were contemplating using the ICBM's for a first strike capability? Otherwise, would it not be more sensible to provide warhead redundancy within the survivable M–X force in its ultimate basing mode? That is, could not the use of two warheads like the Los Alamos and a new Livermore warhead (for example, the Picadon) within the flight proven MK 12A reentry vehicle provide the diversity desired?

ANSWER. For over 20 years a fundamental principle of the design of strategic forces has been diversity. We maintain the three legs of the Triad, among other reasons, to guard against an unforeseen vulnerability with any single leg. It is also important to consider diversity in warhead design within a particular leg of the Triad. One reason this should be done is the possible cessation of nuclear testing. We must consider that at some time in the future such a step could be in our national interest. It will be particularly important, should this occur, to ensure that we do not depend for the effectiveness of our forces on any single warhead no matter how well designed or thoroughly tested.

This general principle—diversity—is evident in the other legs of the Triad. Our air breathing leg will have both B–61 and B–83 strategic bombs as well as the W–80 warhead on ALCM. At sea, Poseidon missiles carry the W–68 warhead while Trident I missiles carry W–76 and, in all probability, Trident II missiles will carry yet a different warhead.

As you can see, the argument for diversity is more broadly based than the rather narrow areas of design integrity and warhead quality. And while there are many approaches for achieving diversity, we believe that development of the ABRV with its W-87 warhead is the proper way to go.

Finally, we have examined alternatives for achieving diversity with the MK 12A reentry vehicle. None of the approaches examined, including the Picadon, were found to be acceptable.

ABRV/MK 12A

Senator THURMOND. If the MK 12A were to be used for M-X, the addition of the [deleted] feature would be incorporated. Would the [deleted] feature also be available for ABRV or would additional development work be required for the ABRV fuze? How do you assess the risk of adding the [deleted] feature to either MK 12A or ABRV?

ANSWER. The ABRV design includes an integrated fuze [deleted]. The cost of this feature is part of the $881 million (fiscal year 1982$) ABRV cost delta. Incorporating an integrated fuze into the MK 12A would have added an additional [deleted] (fiscal year 1982$) to the baseline M-X program. As for risk, arming and fuzing subsystem development is a major driver from the standpoint of schedule. We believe that ABRV, including its arming/fuzing subsystem, can be developed in time to meet a late 1986 M-X IOC. While there has never been a program in being to add an improved fuze to the MK 12A, it is reasonable to expect that availability would be similar to that projected for ABRV.

ABRV CAN USE LESS SNM THAN MK 12A

Senator THURMOND. It has been suggested that ABRV can use less SNM than MK12A and thereby save SNM costs. Is it not true that within the present SNM constraint for strategic weapons, the cost of SNM, although charged to users is a sunk cost and not an additional cost to the taxpayer? Is it not also true that SNM beyond the present total strategic constraint is (a) available through force reprogramming, (b) is available from other material banks (e.g. SSBN reactor bank) if a national need arises, and (c) is presently in production? Is it not also true that at equal SNM allocation to MK 12A or ABRV the overall system effectiveness is about equal when the MK12A weight advantage is considered?

ANSWER. Special Nuclear Material (SNM) for nuclear weapons include plutonium, tritium, and highly enriched uranium [deleted]. Except for the cost to periodically replace the tritium which radioactively decays, SNM cost is not charged against a particular weapon program. The DOD and DOE view SNM as a critical national resource which must be carefully managed to ensure that supplies are sufficient to meet the requirements dictated by the Presidentially approved Nuclear Weapons Stockpile Memorandum.

[Deleted] all warhead development programs consciously consider tradeoffs which would conserve SNM, and priority attention is given to design candidates which use these materials efficiently.

Plutonium and tritium are being produced on a continuous basis at DOE reactors. No [deleted] has been produced for the weapons program since 1964. Currently, there are [deleted] reserved for use in the weapons program. Additional [deleted] if needed in the [deleted] as our latest projections suggest, could be produced in existing US enrichment facilities starting in the [deleted]. The estimated production cost of [deleted].

At any equivalent yield, the ABRV warhead uses significantly less [deleted] than the MK 12A warhead (e.g. [deleted] less at a yield of [deleted]. At a yield of [deleted] saved by using ABRV, vice the MK 12A, on a MX force of 100 missiles is [deleted].

Although a contractor study suggests that at equal SNM allocation the overall system effectiveness for the MK 12A and ABRV are about equal, our analyses show that this is not the case. The study, which assumes a simplistic target base and ignores total force targeting considerations, greatly exaggerates the weight advantage of the MK 12A. Air Force analyses clearly show that the footprinting capability and range of the MX are more than adequate even when loaded with [deleted] of the heavier ABRVs.

QUESTIONS SUBMITTED BY SENATOR WILLIAM S. COHEN

SAVINGS BY ELIMINATING INTERIM BASING FOR THE MX MISSILE SYSTEM

Senator COHEN. It has been suggested, as we seek ways to insure that our Defense dollars are spent as effectively and efficiently as possible, that savings of over $4 billion could be realized by eliminating interim basing for the M-X missile system. The rationale for this argument is that 90 percent of the 40 missiles to be deployed on an interim basis would be likely to be destroyed in time of nuclear attack. Thus, you would be paying over $4 billion for four survivable M-X missiles. What is your response to this argument?

Answer. The estimated cost associated with deployment of 40 M-X in Minuteman silos is $2.6B (fiscal year 1982$). Although this deployment is not a permanent solution and suffers many of the same vulnerabilities of the existing force, it represents a prudent early step toward counter balancing the growth in Soviet hard-target, counterforce capabilities.

The increased accuracy and throwweight of the M-X over even the newest of our Minuteman missiles enables it to place at risk large numbers of hardened, high value Soviet targets. Thus, M-X deployed in Minuteman silos will confront the Soviets with some of the same vulnerabilities we now face and they would no longer enjoy the advantages of the relative invulnerability of a larger portion of their ICBM force.

M-X silo deployment is therefore likely to encourage the Soviets to seek more survivability of their large ICBM force with consequent increases in costs and perhaps some measure of reduced operational capability.

Although the U.S. does not intend to launch its ICBMs under attack or on tactical warning, the Soviets cannot dismiss this possibility. Therefore, deploying M-X in silos coupled with ongoing command and control improvements could reinforce the Soviet perception that the U.S. would launch its ICBMs under conditions of severe threat thus further increasing Soviet uncertainty about the prospects of carrying out a successful first strike.

Additionally, deployment of M-X in Minuteman silos represents an important signal conveying U.S. resolve and commitment to meet the burgeoning Soviet strategic challenge and to stay in the game. It will thus provide us with the highest form of leverage and contribute immeasurably to U.S. opportunities for meaningful and equitable negotiations in the forthcoming strategic arms reduction talks with the Soviet Union.

BMD PROCUREMENT FUNDING

Senator **Cohen**. My understanding is that there was just going to be R&D money in this year's budget for Ballistic Missile Defense. I see though, on page III-66 of the fiscal year 1983 DOD Report, that there is procurement funding of $57.3 million in fiscal year 1982, $59.5 million in fiscal year 1983 and $244 million in fiscal year 1984 for BMD. What are you procuring with this funding?

General **Tate**. There is no BMD procurement funding in fiscal year 1982, 1983, or 1984. The procurement funding shown on page III-66 of the fiscal year 1983 Annual Report to the Congress by the Secretary of Defense, because of the grouping of many individual programs into the three broad functional areas shown on that page, actually is associated with three Air Force early warning radar systems.

MX MISSILES BASED IN SILOS

Senator **Cohen**. If M-X missiles are based in silos, can LoAD defense be used by itself to defend the silos?

Answer. I understand that the Army is putting a high proportion of its LoAD resources into designing a fixed silo defense system because LoAD is the earliest achievable BMD program. I believe, however, that much more needs to be understood about the policy and technical issues associated with LoAD of fixed silos. Since the Administration and Congress have set a schedule of July 1983 to assess the feasibility of LoAD and other defense systems, as well as the other long-term basing options, I believe it is premature to evaluate LoAD's capability to successfully defend fixed silos.

LAYERED DEFENSE FOR MISSILE SILOS

Senator **Cohen**. (If no) How long would it take before we can deploy layered defense for missile silos? How much confidence do you have in your ability to foil countermeasures to such a defense system? How much would such a layered defense system cost?

Answer. The Army projects that layered defenses will not be available until sometime in the 1990's and I don't believe they have fully costed such a system. We are helping the Army understand responsive threats to BMD through the Advanced

Strategic Missile Systems program, but it is too early for us to predict their effectiveness.

HEDRICK SMITH ARTICLE

Senator **Cohen**. Have you seen the Hedrick Smith Article, "Struggling to find a place for the M-X," which appeared in the February 23 New York Times? What is your reaction to his comment that the Administration's indecision on this is becomming an embarassment to the President?

Answer. I would have to take issue with Mr. Smith's assessment of what has transpired since the Administration took office in January 1981. Remember that the Administration took a long, hard look at all of our strategic forces and programs for almost 10 months before they made their announcement on Oct. 1981. This announcement essentially restructured the M-X program. The program is now structured into a near-term phase tc deploy at least 400 missiles in existing Minuteman silos, and a long-term phase which will begin with a decision in July 1983 when one or more options are selected for further development. Those options include the Continuous Patrol Aircraft, Deep Basing and Ballistic Missile Defense.

Mr. Smith's article tends to give the impression that the Administration is wavering on the M-X program. The Administration is working the problem of solving the ICBM vulnerability in a two-phased approach, and this obviously leaves room for concepts to emerge and compete on their own merits. Many will drop out during this process. Some of the points made in Mr. Smith's article are as a result of this dynamic process.

In summary, I don't agree with Mr. Smith's assertion that the M-X program is a "political embarrassment to the Reagan Administration." They want to ensure that the option selected for solving the ICBM vulnerability problem is correct, and I support that goal.

MK 12A RETROFIT PROGRAM

Senator **Cohen**. As you know, the MK 12A retrofit program provided for interchangeable nosetip materials. I understand that with some modification, the two MK 12A nosetip materials will be utilized on ABRV. Will the nosetip portion of the ABRV program be procured as a separate component as was done with the MK 12A?

Answer. It is too early in the ABRV development program to provide a definitive answer. Once a suitable nosetip configuration for ABRV has been determined, competitive procurement may be appropriate. The course of action chosen will depend upon the availability of qualified vendors and their ability to accomplish required actions within schedule constraints.

AF PLAN TO FUND REQUIRED MODIFICATIONS FOR ABRV AND MK 12A

Senator **Cohen**. If this is the case, does the Air Force plan to fund required modifications to both nosetip types?

Answer. As stated previously, it is too early to provide a definitive answer. Once the ABRV nosetip configuration has been determined, decisions regarding procurement will be made.

Questions Submitted by Senator Sam Nunn

CONTINUOUS PATROL AIRCRAFT/DEEP UNDERGOUND BASING OPTIONS

Senator **Nunn**. Do the Continuous Patrol Aircraft and Deep Underground Basing options provide prompt reliable hard target kill, i.e., continue these characteristics considered most unique to current ICBM? What about silo-basing with BMD?

Answer. It is too early in our assessment process to determine the operating characteristics of current deep basing, Continuous Patrol Aircraft (CPA) and BMD options for M-X long-term basing.

Our objective will be to find one or more concepts within these options which will best satisfy our need to modernize our strategic forces. All considerations will be evaluated between now and July 1983.

AIRMOBILE-AIRLAUNCH ICBM'S

Senator **Nunn**. The Air Force studied airmobile-airlaunch ICBMs on a number of occasions and always found numerous reasons, (cost, vulnerability, accuracy) why this did not make sense. Is there any reason to believe the CPA will overcome these problems? What about the issue of vulnerability on the ground and on-station?

Answer. The Continuous Patrol Aircraft concept was studied by the Townes Panel and found to be technically feasible, and at costs and risks similar to the other recommended basing modes. CPA is different from previous air mobile studies because, unlike the others, it does not rely on tactical warning for survival since a large portion of the force is airborne at all times. New composite and advanced propulsion technologies would make this option economically and operationally feasible. Airborne vulnerability is going to be studied as part of a survivability study effort directed by OSD. If survivability is satisfactory CPA will continue to be assessed along with the other promising basing modes.

NUMBER OF DEPLOYED MISSILES TO MEET U.S. TARGETING REQUIREMENTS

Senator **Nunn**. In the deep underground basing option, how do you overcome the problem of targeting the entrance or area bursts? How many deployed missiles would be needed to meet U.S. targeting requirements?

Answer. A major design feature of the deep basing concept is its threat insensitivity to air or ground burst. Basing options currently under study by the Air Force include hardened pre-dug tunnels with concealed entrances coupled with the capability to dig out autonomously from the interior of the basing area. Damage to the area of the entrance itself would not affect this capability.

The requirement for deployed M–X missiles will be determined based on the overall strategic environment projected at the time we develop final plans for deployment. Current administration plans call for the deployment of at least 100 M–X in a survivable basing mode.

POSSIBILITY OF A SMALLER MISSILE

Senator **Nunn**. Is the Air Force studying any possibility of a smaller missile which would provide more basing options?

Answer. Yes, the Air Force is currently studying the possibility for a long-term follow-on small missile capability for the mid 1990 timeframe.

ACCELERATE THE FINAL BASING DECISION FOR MX

Senator **Nunn**. Is there any way the Air Force can accelerate the final basing decision and/or examine other options that will provide the needed arguments that will "buy" more time for the M–X?

Answer. The final basing decision cannot be accelerated without some technical risk. At best, it could be moved ahead a few months.

We believe that we can develop a good survivable basing mode among the options currently being researched.

TESTING AND PROCURING OF MX

Senator **Nunn**. Why should we proceed with testing and procuring the M-X on current schedule if the final basing is not available until 1989? Why should we deploy the M-X in vulnerable silos?

Answer. While it is true that M-X is silos does not solve the U.S. ICMB vulnerability problem a limited number of M-X in silos has significant military and political value:

A minimum of 40 M-X missiles in silos places the Soviets most effective counterforce weapons, the [deleted] SS-18 missiles and their most important superhardened control centers at risk. This in itself limits Soviet first strike options. For example, The Soviets can no longer attempt a precursor attack on U.S. command, control and communication elements and have confidence that their SS-18s are immune from U.S. attack.

The counterforce capability of M-X also signals to the Soviets the prudence of redirecting their long-term efforts toward survivable basing of their systems.

Finally, and perhaps most significantly, M-X deployment in silos provides the United States with substantial negotiating leverage during crisis and during arms reduction talks. It will represent a substantial in-being force that will both limit the amount of coercion that the Soviets can bring to bear and result in an industrial base that makes it in Soviet best interests to encourage arms reduction.

U.S. EMPHASIS ON STABILITY AND SURVIVABILITY FOR MX

Senator **Nunn**. Are there any policies we can implement that don't preclude a launch on warning posture for the M-X in MM silos but which clearly demonstrates to the Soviets that the U.S. places an emphasis on stability and survivability?

Answer. Although it is not a formally stated policy, the capability exists for the National Command Authorities to launch our present ICBM forces on tactical warning or out from under a Soviet attack. This same capability will prevail for the 40 M-X which we plan to deploy in Minuteman silos. In terms of stability and survivability, M-X in Minuteman silos is only one element of the President's broad and coherent Strategic Forces Modernization Program. This program emphasizes the long term development of strategic forces which will provide a secure, stable and survivable deterrent and will create incentives for the Soviets to negotiate genuine arms reductions.

Questions Submitted by Senator Carl Levin

EQUIVALENT MEGATONNAGE

Senator **Levin**. Which combination of weapons represents more equivalent megatonnage (75 B-52D's and 52 TITANs vice 40 M-X)?

Answer. Aggregate equivalent megatonnage (EMT) is a measure of the capability of a nation's strategic nuclear forces to destroy soft targets. Thus, the question should be answered as follows: "There is no direct comparison." While the EMT of 75 B-52D's [deleted], this is really an unfair comparison. This is because the [deleted]. These systems should not be compared under the EMT equations or as tradeoff weapon systems.

DESIGNING THE MX

Senator **Levin**. Is the AF now designing the M-X and its critical subcomponents so that it can adapt to any type of basing? Won't this be more expensive?

Answer. Yes, the Air Force is designing the M-X missile to be compatible with virtually any basing mode. However, this is not a costly procedure since the major interface between the missile and the basing environment is the canister. Therefore, straightforward changes in the canister would permit different types of deployment.

DESIGN CRITERIA

Senator **Levin**. Couldn't some of the design criteria driven by one type of basing mode interfere significantly with the missile operating as cost effectively as possible from another basing mode? For example, why would a missile being launched from a deep underground base require as much reinforcement and structural strength and shock resistant components as a missile to be dropped from an airplane? Wouldn't the requirements of the latter force performance of cost sacrifices on the former?

Answer. The long-term basing modes are being designed using the baseline M-X missile. Our current assessment is that the missile will not require major modification to effectively operate with any of the proposed long-term basing modes.

MX BASING MODE DECISIONS

Senator **Levin**. Let me ask you some questions about the M-X basing mode decisions confronting us. The administration has proposed choosing among the continuous patrol aircraft, ballistic missile defense and deep underground basing for a permanent home for the M-X missile. Two of these have been rejected before because of a host of military-effectiveness and cost-effectiveness problems—deep underground basing and air mobility.

I understand that the continuous patrol aircraft concept is different from the previously rejected air mobile concept, but all that does is raise a new host of technical problems.

The third basing mode—ballistic missile defense—still is an unproven technology in many crucial respects. Even though significant progress has been made in developing the low altitude system (LoADS), it promises to be ineffective by itself in protecting silos since it depended heavily on the deception of a multiple protective shelter basing mode.

The layered defense, which uses LoADS with another high-altitude system to intercept incoming warheads in space, is an extremely high risk system from both scientific and technical viewpoints, primarily because the space-intercept component is at the very "frontier" of technology which has yet to be proved.

Which of these three basing modes do you think has the best potential for proving itself technologically, financially and militarily, and thus solving our M-X basing problem?

ANSWER. It is too early to tell which of the three basing modes has the best potential for succeeding. That is the subject of current studies which will be completed by July 1983.

While we would agree that there are many technical, fiscal, and military questions and challenges with regard to the options, we do not know of anything currently that should eliminate any of the options "a priori" from further consideration. In fact, the range of potentially feasible options for long-term M-X basing makes us quite optimistic about being able to ultimately arrive at a satisfactory recommendation on this issue.

KEY FEATURE OF THREE MX BASING MODE OPTIONS

Senator LEVIN. What are the key features of the three options that led to their selection for further study as a long-term basing mode for M-X?

ANSWER. During the past twenty years, almost 40 basing options for the M-X missile have been studied to find a survivable, enduring basing mode. The most recent study was conducted by the Townes panel. After reviewing these studies the President decided that Continuous Patrol Aircraft, Deep Basing, and Ballistic Missile Defense were the most promising options for further research and development to provide a survivable means of basing the M-X.

Each has promise of survivability: Deep Basing due to its virtually invulnerable locations deep underground; CPA due to its constant mobility; and BMD due to its ability to negate attacking RVs.

CONTINUOUS PATROL AIRCRAFT BASING DIFFER FROM OTHER AIR MOBILE OPTIONS

Senator LEVIN. How does continuous patrol aircraft basing differ from other air mobile variants studied and rejected in the past?

ANSWER. The Continuous Patrol Aircraft option differs from previous air mobile options in that, unlike the others, it does not rely on tactical warning to survive. Since a large portion of the CPA force would be airborne at all times, this option would be prohibitive if existing aircraft were used. Development of the CPA option includes advanced technology on composite primary airframe structures and propulsion, to provide an economically and operationally feasible M-X basing mode. Work on this option still needs to be done to determine its survivability against future Soviet threats.

DEEP UNDERGROUND BASING DIFFER FROM OTHER UNDERGROUND VARIANTS

Senator LEVIN. How does deep underground basing differ from other underground variants studied and rejected in the past?

ANSWER. Advances in technology have made deep basing a potentially effective means of basing the M-X.

Both tunneling technology and egress methodoloy have improved in the last decade to the point where feasibility studies for "deep underground basing" have become of major interest.

DESIRED OPERATING CHARACTERISTICS OF A LAND-BASED ICBM FORCE

Senator LEVIN. Deep underground basing has previously been assessed by DOD as having a slow reaction time and potentially vulnerable communications system, for example.

Will the M-X missiles in either continuous patrol aircraft or deep undergound basing have all the desired operating characteristics of a land-based ICBM force, e.g, prompt counterforce capability, secure and reliable C^3, and enduring survivability?

ANSWER. Assessments are still ongoing to determine the operating characteristics of current deep basing and Continuous Patrol Aircraft (CPA) options for M-X long-term basing. We expect that the details of these operating characteristics will not be totally defined and understood before July 1983.

Technological changes have taken place since DOD last examined deep basing and air launch mode options. For example, the potential of digging machines that might allow quicker egress or the potential of predug portals defended by BMD may well change previous assessments about deep basing responsiveness. In the CPA area, recent breakthroughs in composite material technology may result in a cost-effective survivable air launch mode alternative.

BEST ESTIMATE FOR THE MX IOC

Senator **Levin**. Dr. Keel, what is your best estimate for the M-X IOC in each of its proposed permanent basing modes given a final decision on basing in July 1983?

Answer.

Option:	*IOC*
BMD	[Deleted]
Deep basing	[Deleted]
CPA	[Deleted]

CURRENT PRODUCTION SCHEDULE FOR MX MISSILES

Senator **Levin**. Under the current production schedule how many M-X missiles would be produced before each of the long-term basing modes, if it were chosen, would be ready to accept them?

Answer. Approximately 118 missiles will be delivered by 1988, the earliest year for IOC of the long-term basing mode.

EXPAND THE NUMBER OF MISSILES DEPLOYED IN AN INTERIM BASING MODE

Senator **Levin**. Would you plan to expand the number of missile deployed in an interim basing mode or would you must store them in warehouses as they are produced?

Answer. Currently there are no plans to increase the number of missiles to be deployed in the near-term silo basing mode. However, the requirements for M-X is to provide a credible land-based ICBM deterrent in order to counter an increasing Soviet threat.

At the time a decision is made a enter the M-X weapon system into production, the appropriate size of our ICMB force will be reassessed. Some of the many factors to be considered will be our current assessment of the projected Soviet threat, success of arms control negotiations, and the capabilities of the other components of the strategic Triad—the bombers and submarines.

Additional silo based M-X could be required if our military assessment indicates that they will effectively interact with other strategic forces to further enhance the stable deterrence we seek.

ADDED COST TO EXPAND INTERIM BASING

Senator **Levin**. If you were to expand interim basing to accept the M-X missiles as they were produced what would you estimate the added cost to be?

Answer. It would cost approximately $1B to deploy the additional 60 operational missiles in Minuteman silos.

BMD DEVELOPMENT

Senator **Levin**. Dep Asst Sec Army (R&D) Hoeber's statement, and that of General Tate, are replete with references to how much uncertainty there is in critical areas of developing both a near-term, and a far-term, ballistic missile defense system, with or without deceptive basing. All this is despite the expensive R&D on BMD which has been funded, especially the fiscal year 1982 total of some $400 million, which represented a large increase over fiscal year 1981.

Late last year, PDUSD (R&D) Wade stated additional development was required "over the next few years to be confident that such a defense represents a reasonable way to proceed." He was referring to BMD of fixed silos, one of the options being considered.

In announcing the President's strategic decisions, Defense Secretary Weinberger said: "Well, the decision on ABM, our ballistic missile defense, is simply to study and see if we can get something far more effective than we have now. What we have now is not good enough. . . ."

Considering all these uncertainties, why do you, Ms. Hoeber and General Tate, believe you will have sufficient information available to DOD well enough in advance to support a July 1983 decision about whether to pursue BMD as a permanent MX basing mode?

Ms. **Hoeber**. The BMD program is a major option in the nation's strategic modernization program. The Army is committed to providing high confidence options for the planned decisions in 1983. This will be accomplished through a vigorous BMD R&D program exploiting proven and emerging technologies to increase the effectiveness of the baseline BMD system and eliminate the uncertainties that currently exist.

Much of the baseline system is a natural extension of the LoAD program that had been underway for several years. As a result, there do not appear to be any major technical risks involved in the development program. A comprehensive set of key tests of the interceptor, radar, and data processing subsystems will be accomplished by [deleted] to assure that the system is effective and represents a low risk deployment option. It is also planned to complete tests to prove the capability of system components to operate in a stringent nuclear environment. We believe that these efforts can be accomplished in the allotted time and will resolve the principal risk areas and ensure a high confidence selection.

General TATE. The main thing the Army needs to know is whether it can package a BMD system to defend M-X in multiple potential basing modes and develop that system on a schedule to support a July 1983 decision date and a [deleted] IOC. We are confident we can do this, but it requires more effort and dollars than if we were designing for a single M-X basing mode. Since October 1981, the Army has searched for a "common system" terminal defense design which is sufficiently flexible to provide adequate defense effectiveness for ICBMs fixed based or deceptively based in silos. We believe we have found solutions to this challenging requirement.

It has already been demonstrated through prior programs (e.g., Safeguard and Site Defense) that BMD will work. The baseline terminal defense system is based on both proven BMD principles and techniques and innovative technology that strengthens the capability to perform critical BMD functions. The application of these principles and the evolution of technology over the past 5-10 years has enabled dramatic improvements in BMD capability. In the Safeguard program, as well as the preceding Sentinel and Nike-X BMD programs, the feasibility of intercepting intercontinental ballistic missiles was demonstrated. In the follow-on Site Defense program, in 50 successful missions at KMR, it was demonstrated that a BMD system could adequately differentiate between lethal RVs and decoys.

The experience of the Site Defense program established a sound basis for estimating overall BMD effectiveness. The capability for search [deleted] and the capability for discrimination [deleted] were experimentally verified. Since interceptors were not fired in the Site Defense program, [deleted]. Overall, this leads to a confident estimate of [deleted] percent effectiveness achievable for a system like Site Defense. The baseline terminal defense system goal is [deleted] percent probability of intercept.

In order to support the 1983 decision, it is necessary to further refine the design, work out the details of joint basing with M-X (in continued close coordination with the Air Force), and document and production/deployment plan including realistic cost estimates.

Technically, one of the major issues which must be resolved is whether [deleted].

Other technical issues which will be addressed prior to the July 83 decision date include the performance of the distributed data processing system, the propulsion and aerodynamic performances of the interceptor, and the operability of the radar at the X-band design frequency.

BMD ACCEPTABILITY

Senator LEVIN. If DOD will place more emphasis on BMD with deceptive ICBM or BMD-interceptor basing, why do you think such basing will be any more acceptable—politically, financially or militarily—than the MPS system rejected by this administration. Wouldn't any deceptive basing scheme require large numbers of interceptors, even with preferential defense, and wouldn't this cause cost and political problems?

General TATE. In silo defense, the effectiveness of BMD is achieved through preferential defense [deleted]. In this mode, the leakage (percent of RVs that are intended to be intercepted that are not successfully intercepted) of the BMD system must be designed for no more than about [deleted]. This leakage objective can be met with current BMD technology. [Deleted.]

The effectiveness of BMD is enhanced for defense of deceptively-based M-X. If the M-X were deceptively deployed, the baseline terminal defense system would be capable of providing a [deleted] as for fixed silo based M-X.

An undefended MX/MPS deployment would not provide the same survivor level against large attacks even when a 4,600 shelter deployment was considered.

The Army cannot elaborate on the costs for the new M-X basing concepts currently under evaluation by the Air Force. However, from the BMD funding standpoint the requested fiscal year 1983 funding level for developing BMD for silo-based ICBMs did not change as a result of the termination of MPS. At this point in the acquisition cycle it is possible to proceed and maintain the option to defend ICBMs that are either fixed or deceptively based in any of the deployment concepts that include BMD being considered by the Air Force.

A silo-based deployment in existing Minuteman fields would probably be more politically acceptable fundamentally because it would involve little more than extension of an existing strategic system in its present deployment locations. For the populace in the areas a silo-based ICBM is essentially a known quantity. Since the requisite support structures (operating and support bases, road nets, utility systems, security and command, control and communication systems) and relationships already exist, adverse environmental, social, and economic impacts can be minimized. Addition of a defense of a silo-based deployment [deleted] would require very little additional land. The impact of a gradual buildup of the personnel required to operate the system would be spread [deleted].

The effect of deceptive basing is to increase Soviet uncertainty as to the locations of targets [deleted]. The effect of preferential defense is to create uncertainty to the attacker as to which of the defensible targets are actually being defended. This is a choice that can be made by the defense prior to or during the attack and also results in a reduction in the number of defense units required. Employing either deceptive basing or preferential defense strategy would reduce the defense system cost.

EMPHASIS ON BMD WITH DECEPTIVE ICBM OR BMD-INTERCEPTOR BASING

Senator LEVIN. If DOD will place more emphasis on BMD with deceptive ICBM or BMD-interceptor basing, why do you think such basing will be any more acceptable—politically, financially or militarily—than the MPS system rejected by this administration?

Wouldn't any deceptive basing scheme require large numbers of interceptors, even with preferential defense, and wouldn't this cause cost and political problems?

ANSWER. The Air Force is examining a number of M-X basing options which could provide high survivability. These options combine passive defense design, deception, and active defense characteristics. As we refine our options further we will better understand the tradeoffs between these characteristics and how they effect the political, military, and cost considerations.

SYSTEM EFFECTIVENESS

Senator LEVIN. Even with BMD, why should such a system be any more effective than MX/MPS with its 1,000's of shelters requiring 1,000's of attacking Soviet warheads? The Administration rejected that because it felt the Soviets could easily overwhelm it with RVs. Why isn't the same true for even a BMD system considering the Soviet capability to add RVs without much scientific problem or without significant additional expense compared to the expense of our deploying or expanding a BMD system?

General TATE. There are two factors combining to make the current deceptive schemes more cost-effective. The first involves the price in terms of Soviet RVs required to defeat the system. The MX/MPS, even when defended could charge the Soviets a price of only [deleted]. The current systems, due primarily to the [deleted]. This would require significant cost and the cost exchange ratios would be more attractive to the U.S.

EFFECTIVENESS OF EMPHASIS ON BMD WITH DECEPTIVE ICBM OR BMD INTERCEPTOR BASING

Senator LEVIN. Even with BMD, why should such a system be any more effective than MX/MPS with its 1,000's of shelters requiring 1,000's of attacking Soviet warheads? The Administration rejected that because it felt the Soviets could easily overwhelm it with RVs. Why isn't the same true for even a BMD system considering the Soviet capability to add RVs without much scientific problem or without significant additional expense compared to the expense of our deploying or expanding a BMD system?

ANSWER. A primary objective of all the long-term M-X basing options, including BMD, is to develop system concepts that will provide us with inherent survivability. We all want a system which is not overly sensitive to Soviet RV proliferation. Since the side-by-side comparison of the long-term options is scheduled for next year, I believe it is too early to predict the sensitivity of a BMD system to Soviet warhead proliferation.

BMD FUNDING LEVEL

Senator LEVIN. General Tate, would you provide your best estimate of the funding levels, yearly, in R&D and procurement, necessary to permit a [deleted] IOC.

General TATE. BMD is one of three options for long term ICBM survivability, therefore, is is only one portion of the overall strategic package under evaluation by the Administration. The Baseline Terminal Defense System (previously LoAD) is the BMD system being developed to provide the [deleted] IOC. The MX basing mode selected will influence BMD system requirements and therefore a corresponding outyear costs. At this time, the BMD program has firm funding figures only for RDTE and only through fiscal year 1983.

Senator WARNER. This subcommittee is now adjourned.

[Whereupon, at 5 p.m., the subcommittee adjourned, to reconvene upon the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

FRIDAY, MARCH 5, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

SEA-BASED DETERRENT

The subcommittee met in open session, pursuant to notice, at 8:35 a.m., in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner and Levin.

Staff present: Frank J. Gaffney, professional staff member; Francis J. Sullivan, minority staff director; Patrick L. Renehan, professional staff member; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; and Jim Dykstra, assistant to Senator Cohen.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. Good morning, ladies and gentlemen. The subcommittee will come to order. We will proceed with another hearing at this time on the aspects of the sea-based strategic deterrent forces.

It is the policy of the chairman that we will endeavor to have the testimony provided in open session to the maximum extent as possible, thereby affording the public, hopefully, a clearer and better understanding of the need for the President's enhanced budget request for fiscal year 1983.

Mr. Secretary, will you kindly lead off with any comments you may have? And then, if you will, designate your other panel members in the order that you desire to provide their opening comments.

STATEMENT OF MELVYN R. PAISLEY, ASSISTANT SECRETARY OF THE NAVY, RESEARCH, ENGINEERING AND SYSTEMS

Mr. PAISLEY. Mr. Chairman, I have with me today two principal witnesses, I think both of whom have been here before. Rear Adm. Frank Kelso, whom I know has testified before this committee before, he is the Director of the Strategic Submarine Division. He will be giving you an overview of the Navy's strategic program.

Also we have brought down Admiral Webber, and he will be talking about a recent General Accounting Office report in regard to the building of the Trident submarine, two things that I know you are particularly interested in.

I have submitted a statement for the record. I would like to make a few comments, brief as they may be, and then go into Admiral Kelso's statement.

Senator **Warner**. It is clear that all of this will be followed by an executive session. Go ahead.

Mr. **Paisley**. This is my first time to testify since I have been in this position.

Senator **Warner**. Well, it is a unique experience and one you can look forward to on many occasions. Right, Admiral Kelso?

Admiral **Kelso**. Yes, sir.

Mr. **Paisley**. I might say that I feel very fortunate to be in front of this subcommittee first, because I know the degree they have supported the sea-based leg of the Triad. So I know that we have had strong support from this committee.

I also feel fortunate because I am very familiar with the nature of work that is required to bring this sort of system into being, and I can say without reservation I feel that the Navy team that is working on our strategic programs, and particularly the Trident program, is probably the best acquisition team that is in the service today. I really feel that way. And we have been able to bring an industrial team together through some competitive planning, and I feel that that industrial team is probably second to none. So I feel very fortunate. It is a stable program, and the support that this committee has given of course has added to that tremendously.

We have about 11 percent of our R. & D. in the Navy in the strategic area. It is an increase of about 27 percent over last year, and that is a reflection of the Trident II program start. We are looking right now at some of the things we might do and the benefits of these things to accelerate the IOC, and in the near future we will be coming forward, if this plan in fact benefits, to show you what we have in mind. And you might want to have us talk in more detail in the question period.

Senator **Warner**. Now, when you say accelerate the IOC, which of the components of it, or is that all the components together? You have got the basic nuclear submarine, you have got the missile. When you say accelerate, what is it you are referring to?

Mr. **Paisley**. Basically, I talk about accelerating the missile. But it requires all components of the system to come together. We are even looking at the loading program that might be different.

When we come forward, we will be showing you all aspects of it. Fundamentally, the problem, the hardest thing to accomplish, the part of the system that you have to look at in the greatest detail is the missile itself. Because the basic requirement that we are directing ourselves toward, while not totally in the missile; there are some navigational problems associated with it; it is basically the missile problem.

In my statement that I have submitted I talk about some other strategic programs such as our ECX. But I understand that the paramount reason for the hearing today is to talk mainly about the Trident program. But we are prepared to discuss other aspects.

Senator **Warner**. The paramount purpose of this hearing is to provide a record to substantiate the Department of the Navy request in the strategic area in fiscal year 1983. So this record must reflect every element of that request and have substantiating facts.

Mr. **Paisley**. And like I say, all three of us have submitted statements and we have covered these aspects. One of the things—there are a lot of things that people talk about these days in the Government associated with improvements, Carlucci initiatives. And I have looked at those carefully and the Navy is working hard on implementing some of these concepts into the Navy and into our acquisition programs.

When you look at the Trident program, you see that many of these initiatives have been in for a long time and that is one of the reasons the program is stable, and so it reflects in itself thinking that has flowed in a different form and a different name into the Carlucci initiatives, and I also feel very good about that. I have reviewed a lot of the testimony that has come before this committee in the last 2 years in preparing myself for this sort of testimony, and I might say that I am delighted to find I think the committee can disagree without being disagreeable. Not all the testimony I find falls into that category, and therefore I find a degree of delight to be here, first, as I mentioned at the start.

Senator **Warner**. Mr. Secretary, an observation by the Chair. You are quite accurate in your belief that the subcommittee is supportive. That is, not only the subcommittee but the Armed Services Committee as a whole, and indeed the Senate as a whole.

The naval strategic program is one that was carefully thought out as you say. Some of the finest oficers in the Navy, and civilians, have participated with the Navy to make it possible. We appreciate having you here as a new member of the team and we look forward to working with you in the years to come.

Mr. **Paisley**. Thank you.

[The prepared statement of Secretary Paisley follows:]

Prepared Statement of Melvyn R. Paisley, Assistant Secretary of the Navy, Research, Engineering and Systems

INTRODUCTION

Mr. Chairman and members of the committee; It is an honor and a pleasure to appear before you for the first time to present the Department of the Navy fiscal year 1983 Research, Development, Test and Evaluation Strategic Program and Budget. I believe this strategic program provides the strong but cost-effective program required to meet the needs of the sea-based leg of the Triad.

At the table with me today are Rear Admiral Frank Kelso, Director, Strategic Submarine Division, Office of the Chief of Naval Operations, who will provide you with an overview of the Navy's Strategic Program, and Rear Admiral J. H. Webber, Vice Commander Naval Sea System Command, who will discuss a recent General Accounting Office report concerning the building of the Trident submarine.

In my presentation today, I intend to fulfill the commitment I made to the Congress in my confirmation hearing to be forthright in my dealings with the committees. I will begin my testimony with a brief discussion of our Research and Development Policy and Strategy, and how they are being utilized in the D-5 program. I will then provide a brief overview of our Strategic Research and Development program, particularly the D-5 system.

RESEARCH AND DEVELOPMENT POLICY AND STRATEGY

Management philosophy.—My intent is to manage Research and Development programs using an open and participatory style. My organization and its interfaces have been restructured to provide for controlled decentralization and a team effort when Research and Development technical and business decisions are made.

Last year, Secretary Lehman reorganized the Secretariat to focus on the objectives he has defined for the Department of the Navy. I am closely working with the other Assistant Secretaries of the Navy to integrate our management functions and responsibilities into a close knit team for Research and Development System Management decisions. This team is also making decisions to delegate responsibility and authority in order to improve organization efficiencies and reduce layering. Within my own staff, I have restructured to focus on air, submarine/antisubmarine warfare, surface, and strategic issues. The new emphasis in the Secretary of Navy's Office on strategic issues is particularly pertinent since the acquisition strategy for the D-5 missile is currently being reviewed and our objective is to develop the system in the shortest time for the lowest cost.

My goal is to expedite the Research and Development process with a minimum of procedures and formal reviews. I have established communication in the vertical and horizontal directions of the organization, and I am working to solve issues offline to avoid the delays caused by formal documentation and meetings.

The decisions made concerning the Research and Development programs to support the Secretary of the Navy's strategy have required a significant change in our Research and Development policy. We are intent on stabilizing and properly structuring the programs to meet the modernization required. Over the past six months, about 40 programs were cancelled to counter the tendency to spread dollars over too many programs. We have also focused on the performance and readiness thresholds required so programs deliver the baseline system without requirement creep and the costly attempt to meet gold-plated goals. We have stopped chasing rainbows; and each of the four major programs that I have reviewed since being confirmed were not approved for the next milestone until this policy was achieved.

All of the above actions are analogous to the President's theme of "getting the government off the back of the people," as I plan to develop a system acquisition management process and organization structure that will get the system off the backs of the program managers, scientists, and engineers of our in-house and industrial teams.

System acquisition views.—I have made several references to actions to shorten the acquisition cycle. Every official in the Department of Defense makes shortening the cycle a primary objective. The problem has been that it is a very complicated issue and a thorough understanding of the trouble spots has not been achieved. I would like to briefly discuss with you several of the areas in the process that I consider to be trouble spots, and indicate steps we are taking to resolve them.

1. Fuzzy requirements.—Our requirements have been allowed to grow during development, especially between milestones, and this has increased the schedule and risk. Also, by using threshold and goals, we have increased costs and schedule to achieve the goal requirements when the threshold values would have been sufficient. This has stopped. The programs which have been recently reviewed will not change the requirements in the milestone phase approved. In addition, program requirements are only being defined as thresholds.

2. Budget decisions.—Our System Acquisition and Budget processes were independent management systems for many good reasons. However, budget decisions were overturning milestone decisions without sufficient attention to program impact. This caused program stretchout and, frequently, reduction in the efforts planned for readiness, test and evaluation, and logistics. The results have been obvious. Recent Department of Defense policy changes are correlating the two processes better, and I am personally reviewing the budget decisions to assess the impact on program structure. The inverse of this is also true. Program Managers cannot make decisions to change a system without approval at the Secretariat level if the system change increases the funding profile in the Five-Year-Defense-Plan.

3. Transition to production.—The full-scale development and production phases were allowed to be decoupled causing gaps and poor technical transfer to production. This aspect of a program is being reviewed beginning at the first program phase and at each milestone thereafter. We are now approving the use of concurrency when common sense and/or the risk of the development warrants it. This will not only shorten the cycle, but will permit a more effective transfer of the design to production.

The above are examples of how trouble spots are being worked, and I am also utilizing new processes or adopting current processes to improve the acquisition strategy for systems. I will briefly describe two initiatives that I feel will have high payoff:

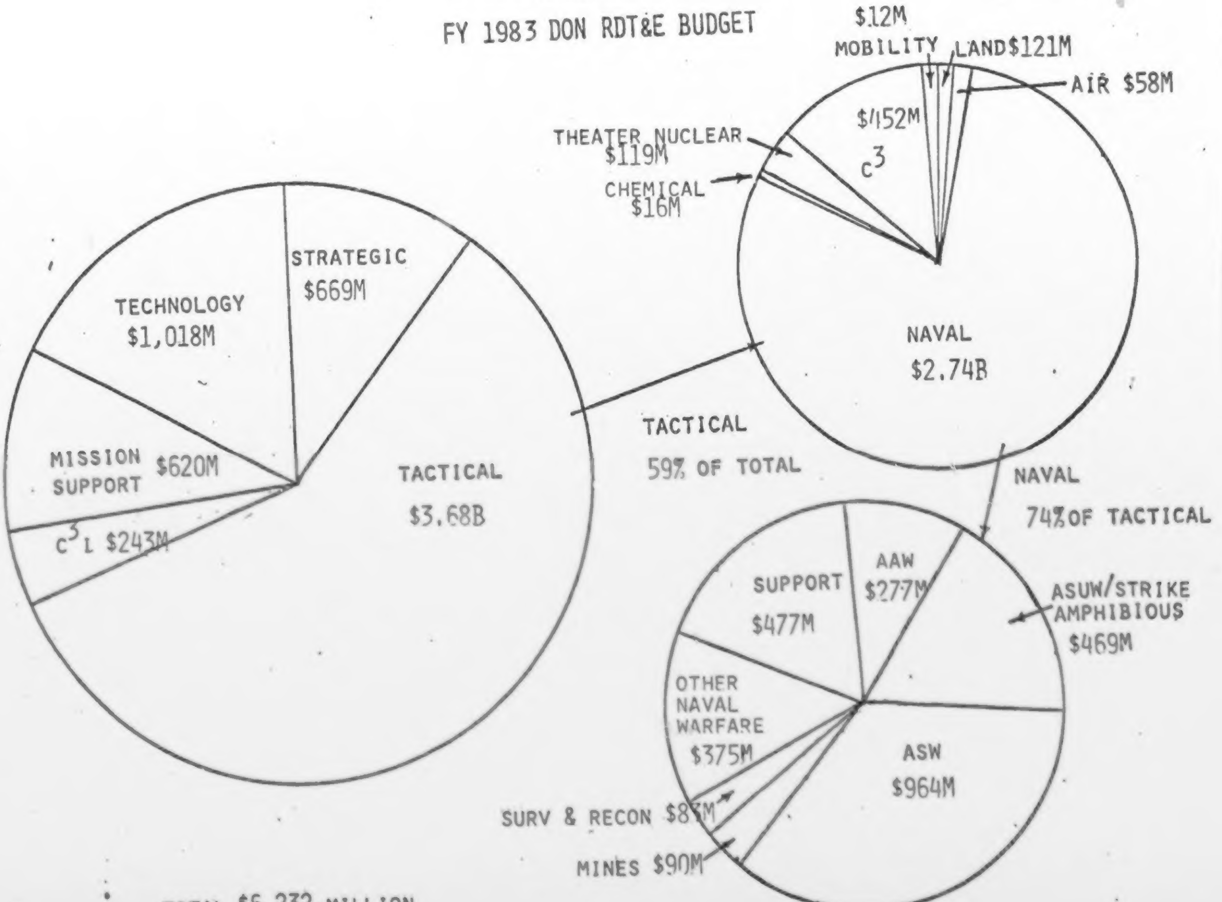
1. Competition/incentives.—Of the current System Acquisition Report programs, 70 percent were competed. Competition was utilized at a point in the development that made the program's development cost-effective. This will continue. However, the contractor frequently does not have an incentive/award-type contract which would result in a design that balances cost, performance, and readiness for the purpose of achieving a quality system at low-unit cost. I have taken steps to establish this as a way of doing business. During the past year, such competition initiatives have been used for the Advanced Self-Protection Jammer, High-Speed, Anti-Radiation Missile, and Tomahawk Cruise Missile programs.

2. Pre-planned product improvement.—Our weapon systems have been utilizing an effective form of pre-planned product improvement for many years by evolving, through engineering changes, to meet new threat changes and to use advanced technology. As used now, pre-planned product improvement will force more planning in the beginning of the program which will enable us to shorten the cycle and lower the costs of the development by utilizing a planned evolutionary process. Over 45 systems are currently candidates for the pre-planned product improvement system acquisition strategy. But, virtually every system is conceptually a candidate, and I have taken steps to ensure that pre-planned product improvement concepts have been used on each of the four programs for which I have conducted a milestone review.

RESEARCH AND DEVELOPMENT PROGRAM ISSUES

The following chart breaks down our fiscal year 1983 Research, Development, Test and Evaluation Budget into the various Budget Activities. As can be seen, about 11 percent of the budget is devoted to Strategic Warfare. This represents a 27 percent increase over Strategic Research and Development in 1982 and reflects the decision to begin development of the D-5 missile. I would like to highlight certain decisions, plans, and programs for you.

FY 1983 DON RDT&E BUDGET



TOTAL $6,232 MILLION

The Submarine Launched Ballistic Missile, the SLBM, is essential to our strategic policy. It represents the most survivable leg of our strategic Triad. The new Trident II D-5 missile, with its greater size and accuracy has the potential for a counterforce weapon. And with its much greater range and operating area, it can add greatly to its survivability. Hence, the D-5 will have the potential to maintain a highly survivable Triad with counterforce capability.

We have full confidence in being able to mechanize such a high performance, accurate missile within our on-going plan and program. The missile guidance and control for the needed accuracy have been under intensive and successful development. and the missile itself is essentially a scale-up of the successful Trident I C-4 missile.

These developmental successes give us the confidence to plan an accelerated D-5 development program in which we expect to achieve Initial Operational Capability one to two years earlier. We would also expect a significant total development cost savings. However, there would be some additional front-end funding required. Accordingly, the program is being structured to include a substantial degree of concurrency, pre-planned product improvement, and early Test and Evaluation.

With this program acceleration, we would improve both our strategic posture and our total cost position.

As part of the Navy's strategic system, we are developing command and control programs to provide a more rapid response and greater connectivity. These programs will result in more reliable, effective, and survivable systems and will further reduce submarine vulnerability. A new ECX aircraft for the TACAMO mission will provide greater range and continuous survivable communications and will replace the aging EC-130 system. The Extremely Low Frequency program now under development at the Wisconsin Test Site, will provide a one-way, low-data-rate link to submarines. This system will further reduce submarine vulnerability to detection while the submarine is on patrol. Finally, a joint satellite program with the Air Force, MILSTAR, will provide Extremely High Frequency communication from command centers and the submarine.

As a result of these strategic system changes, the possibility of Soviet pre-emptive attack will be made more remote, thereby enhancing our objective of the preservation of world peace through restored parity and stability. I am satisfied that the balance between expenditures for strategic systems has not overly impacted that of general purpose conventional forces.

Mr. Chairman, I wish to thank the Committee for this opportunity to discuss this part of the Research and Development program with you and look forward to participating in a continued fruitful relationship in the future. At this time, I stand ready to answer your questions. Thank you.

Senator WARNER. Admiral Kelso?

STATEMENT OF REAR ADM. FRANK B. KELSO II, U.S. NAVY, DIRECTOR OF STRATEGIC SUBMARINE DIVISION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

Admiral KELSO. Good morning, Senator. It is again a pleasure to appear before your committee and to participate in the important work of the committee. With your permission, sir, I will submit my statement for the record and summarize some of the highlights, to provide more time for questions on the things you would like to cover.

I am very pleased to tell you this morning that in my analysis, the sea-based leg of our Triad remains survivable, since I last testified before you. It is still an endurable and a reliable force. Our testing and research has continued to demonstrate these characteristics of the system over the past year.

We have deployed five additional Poseidon ships backfitted with the Trident I missile this last year. That brings us up to a total of 7 of the 12 that we plan to backfit. Three additional ships have received the backfit hardware and are in the process of training and the prework before deployment. That leaves us two more that are in the shipyards to come out. We will complete that program of 12 ships by about the spring of 1983.

The *Ohio* has joined the fleet. We expect her to deploy in the fall of this year. The ship has performed well. It has exceeded or bettered its performance design specifications of speed and quietness. She has fired her first Trident I missile and it was an unqualified success.

The second ship, *Michigan,* appears to be on schedule. We expect to deliver her this year in the fall. Operational tests on both Poseidon and Trident I missiles have continued to demonstrate these systems' performance.

Senator WARNER. Admiral Kelso, just a little bit of history now. You refer to ships. Has the Navy begun to swing around from boats to ships? It is just curiosity, but I am an old traditionalist.

Admiral KELSO. I guess if I want to, I would call it a boat. I referred to her as a ship this morning. She is over 18,000 tons and we call her a ship. It has been a controversy as far as we submariners for a long time as to whether we call them boats or ships.

Senator WARNER. I remember the night at about 8 in Secretary Schlesinger's office, people there finally nailed down the number of tubes and determined the length and beam and the powerplant, and that was it. So it is now referred to both ways, is that it?

Admiral KELSO. I think so, depending on whom you talk to.

We have basically completed the base at Bangor, Wash., and it has been turned over to CINCPACFLT for operational control. A major change from last year, when we testified before your committee, is that the Reagan administration has directed the Navy to proceed with an SLBM modernization program which includes development of a more capable D-5 missile. It has told us to go ahead with a steady shipbuilding rate for Trident submarines and has directed deployment of nuclear-tipped cruise missiles on attack submarines for the mid-1980's. And the President's fiscal year 1983 budget reflects these decisions on our program.

So we have a far more stable program and know better about where we are going, depending on how Congress votes on this budget, than we did last year.

In summary, sir, the sea-based leg of the Nation's deterrent is at sea doing its job today. Its capability is improving steadily, and there is an ongoing modernization program to enhance its future capabilities. American sailors have completed over 2,045 patrols. This is about 380 ship-years at sea for these dedicated men since 1960.

Your support for the Navy's strategic force is greatly appreciated and has been fundamental to its continued ability to serve our Nation.

This is a short review of my statement.

Senator WARNER. Thank you very much. Your entire statement will be entered into the record.

[The prepared statement of Admiral Kelso follows:]

PREPARED STATEMENT OF ADM. FRANK B. KELSO

Mr. Chairman and members of the committee, I am Rear Adm. Frank Kelso, Director of the Strategic Submarine Division in the Office of the Chief of Naval Operations. My purpose is to update for you the status and capabilities of current Navy strategic forces and to discuss Navy planning to implement the President's strategic program decision announced last October. I again appreciate the opportunity to appear before the committee and to participate in your important work.

National strategic nuclear policy has in recent years changed from a primarily countervalue, assured destruction policy toward one of greater flexibility for the national command authorities. The fundamental objective of national strategy remains deterrence, but it is deterrence achieved through a flexible and enduring force, capable of responding appropriately to every level of violence. For the foreseeable future, nuclear forces must serve at least the following four purposes: First, to deter nuclear attack on the United States or its allies; second, to help deter major conventional attack against U.S. forces and our allies, especially in NATO; third, to impose termination on major war—on terms favorable to the United States and our allies—even if nuclear weapons have been used—and in particular to deter escalation of hostilities, and fourth, to negate possible Soviet nuclear blackmail against the United States or our allies. The accomplishment of those purposes, and the more specific objectives that they entail, require a multiplicity of strategic forces which are sufficiently survivable, enduring, and capable to support employment requirements, and which will provide the President with the greatest amount of flexibility for employment of forces to meet any threat contingency.

The sea based leg of the Triad has since its initial deployment in 1960 provided the Nation with a credible, secure deterrent. Its greatest assets over the years have been the invulnerability of the submarines from detetion, the reliability built into the system from both material and personnel standpoints, its ability to endure and be available when called upon and the ability to demonstrate through operational testing that the system will perform as designed.

The relative invulnerability of our strategic submarine force continues to be its greatest attribute. It remains survivable. By survivability, I mean specifically "the capability of a system to withstand a hostile environment without impairment of its ability to accomplish its mission." Current national policy demands survivability in our strategic forces to minimize pressure on the national command authorities to "use or lose" our strategic forces once conflict is initiated. The survivability of the at sea submarine force is expected to remain unchanged for the foreseeable future.

Along with survivability, the strategic submarine force demonstrates substantial endurance. Endurance pertains to the capability to sustain the effectiveness of the system over a period of time. The purpose of endurance is to insure that strategic forces could continue to be employed effectively to meet national objectives until the conflict is terminated. The strategic submarine force can sustain its capability over an extended period of time without reliance on external support—an important attribute in a war of undetermined length.

To provide the necessary capability and flexibility, U.S. strategic nuclear forces must be able to attack effectively, or withhold from attack and threaten the subsequent destruction of, a broad spectrum of potential targets. This has been a primary area of concentration in the development of our strategic submarine weapons. The capability of the Navy's SSBN's measured in target destruction capability has improved this past year and will continue to do so throughout the next two decades. This is attributable to significant modernization advances which commenced in the mid 1970's. We have modernized missiles, ships, and bases. Submarines today are on deterrent patrols, deployed from Holy Loch, Scotland; Kings Bay, Georgia, and Charleston, South Carolina. American sailors have completed 2,043 strategic deterrent patrols as of the end of 1981. To put that in perspective, this represents 380 ship-years since 1960 at sea for these dedicated men. One at least has completed 26 patrols, a period of 5 years under the sea. They are a dedicated group of young men and they appreciate very much the encouragement and support that they have received from this Congress.

Our original 41 SSBN's were commissioned in an 8-year period from 1959 to 1967 with a 20 year design life. However, an extended service life of 30 years has been determined to be feasible for the 31 *Lafayette* class SSBN's, and their retirement dates have therefore been extended into the next decade. Their size and design, though, preclude backfitting modern noise reduction techniques and systems into these ships. This, coupled with the lack of continued missile growth potential, prevents further major improvement in their strategic capability. To replace these ships and to maintain the present invulnerability of our strategic submarine force into the 21st century, we embarked on the Trident shipbuilding program with authorization of the lead ship, USS *Ohio*, in fiscal year 1974. Since then, eight more Trident submarines have been authorized, with two more being requested this coming budget year.

USS *Ohio*, the first ship of the Trident class, was delivered on October 28, 1981, and commissioned on November 11, 1981. The second ship of the class, *Michigan*, is on schedule and is expected to go on builder's trials in June with an anticipated delivery date of September 30, 1982. The contract for the ninth Trident submarine was signed in January 1982 with options for up to two additional *Ohio*-class SSBN's.

President Reagan announced on October 2, 1981, as a part of his strategic program, that *Ohio*-class SSBN's would be requested at a steady procurement rate of one per year, with the tenth submarine being requested in fiscal year 1983 in addition to the one strategic submarine (eleventh) already planned. This is the program that is now before the Congress. The Poseidon submarines will reach the end of their 30 year service life in the 1990's. We need to replace these aging ships, and the presently programed building rate is adequate to accomplish this. A Trident building rate comparable to that of the Poseidon ships is not required for two reasons: Each Trident submarine is far more capable than the Poseidon submarine, particularly in terms of missiles carried and destructive capability; and second, we have commenced building Tridents at a steady rate in advance of the Poseidon submarine force's retirement. This yields a further advantage in that we will not be faced with a similar problem of block obsolescence for Trident submarines. Force effectiveness will continually improve because of the improved accuracy and greater yield of the more modern missiles which will be carried in these launchers. The force effectiveness will take a quantum jump when the new Trident-II (D-5) missile enters the fleet in 1989.

The USS *Ohio*, as stated before, was delivered to the Navy last October, and is presently at sea conducting shakedown operations. It is an extraordinary submarine indeed; its quietness, speed and modern systems represent a significant advance over the current SSBN force. On the first realistic test of its mission capability, USS *Ohio* successfully launched a Trident-I (C-4) missile. The launch was flawless, and the missile flew perfectly over 4,000 nautical miles. The ship has exceeded or bettered its performance design specifications in such significant areas as speed and quietness.

Turning to the area of missile modernization—the newest missile, Trident-I (C-4), currently backfitted on seven of our Poseidon SSBN's, has proven to be an exceptionally reliable missile. The excellent results first demonstrated in the missile's developmental test program have continued to be exhibited in the operational missiles. The Trident-I (C-4) missile has significantly bettered the design parameters in range, accuracy, and reliability. By March 1983, a total of twelve Poseidon submarmines will have been deployed with that missile. Trident-I (C-4) provides these ships with increased survivability inherent in the greatly increased operating area afforded by the missile's increased range. The backfit program also permits these submarines to cover potential targets from their base at Kings Bay, Georgia, without the need for a lengthy transit. This capability, as a result of greater missile range, also reduces our future dependence on overseas bases. The remaining 19 Poseidon SSBN's continue to carry the very capable Poseidon (C-3) missile which is the backbone of our force today. The backfit program has provided flexibility and added strength to our strategic submarine program. However, these Trident backfit SSBN's are not a substitute for the modern Trident submarines with the potential for future missile growth which will provide the strategic force of the 1990's and beyond.

The missile tubes in the new Trident submarines were designed larger than that required by the Trident-I (C-4) missile to provide growth for follow-on missiles with greater capability. In fiscal year 1981 we embarked on an advanced development program for a follow-on missile with improved accuracy and payload characteristics with optimize the effectiveness of the Trident fleet in supporting future national deterrence objectives.

The follow-on missile, called the Trident-II (D-5) missile, will provide the submarine leg of the Triad with a cost-effective capability against the full spectrum of Soviet targets through a combination of accuracy and payload improvements. Initially, designs for improved accuracy and range versions of the Trident-I (C-4) missile were kept current during the advanced development program. However, as a part of the President's strategic program, the decision was made to proceed solely with development of the Trident-II (D-5) missile which will utilize the full launch tube envelope of the *Ohio*-class SSBN, and which will have significantly improved accuracy while maximizing the range/payload parameters. The improved accuracy program, a technology program which completes this year, gives us the technological assurance that the accuracy goals for the Trident-II (D-5) missile can be achieved.

The new submarine base at Bangor, Washington, was essentially completed this past year and was turned over to the fleet on July 1, 1981. The base is in full operation; although USS *Ohio* will not arrive until this summer, the base has been supporting other fleet and submarine force operations. Submarines have been repaired there throughout the past year. Trident crews are being trained at the Trident training facility, and the strategic weapons facility is fully ready to support operations with the Trident-I (C-4) missile carried aboard USS *Ohio*. The base is being fully utilized, all quarters are occupied, and all support activities are in operation.

With a projected Trident SSBN force level of at least 15 submarines, it was recognized that additional basing facilities would be required. National strategic considerations, including the need to have modern SSBN's in both the Atlantic and the Pacific theaters to present a future two ocean antisubmarine warfare problem to the Soviets, strongly supported the construction of a Trident base on the east coast of the United States.

After the completion of extensive strategic and environmental studies, the Secretary of the Navy announced on October 23, 1980, the selection of Kings Bay, Georgia, as the location of the Trident Atlantic Coast Strategic Submarine Base. Base construction begins this year and is planned to complete in late 1989. Because of a stringent schedule dictated by the lack of existing infrastructure, and because of the environmental and operational limitations on construction, the base construction at Kings Bay will take longer than at Bangor. For this reason, construction commenced this year. When completed, this base will have the same essential components as does the base at Bangor and will fully support the second squadron of *Ohio*-class SSBN's armed with Trident-II (D-5) missiles.

As another part of the strategic improvement program announced by the President last October, we have embarked on a program to deploy nuclear-armed cruise missiles on some of our attack submarines. The initial operating capability for the variant of the cruise missile we are developing for this purpose, the nuclear land attack version of the Tomahawk missile, is June 1984. To further enhance the strike capability of these attack submarines, a vertical launch system (VLS) is being installed on the SSN 688 class submarine. The first installation of the VLS will be completed in December 1985. We plan to deploy a small number of nuclear-armed cruise missiles on SSN's starting in 1984. The exact number to be deployed on each SSN has not been determined—the specific mix of nuclear land attack, conventional land attack and antiship Tomahawks to be carried on each SSN will be determined by the fleet commanders in chief depending on factors such as areas of operation and planned mission. None of these cruise missiles will be dedicated to the SIOP. Nuclear SLCM's will be part of the strategic reserve force and will be available for reconstitution and targeting, if necessary, during the post-SIOP periods. Deployment of nuclear land attack cruise missiles on highly survivable SSN's will be particularly valuable as an addition the U.S. strategic reserve force to bolster the deterrent posture.

In summary the sea based leg of our deterrent is at sea today protecting our Nation; its strategic capability will continue to improve in the near term as we increase the number of more capable Trident-I (C-4) missiles in the force by backfitting Poseidon ships and deploying Trident submarines. We have ongoing programs to improve the missile capability to span the total target spectrum and to enhance the capability of our strategic Reserve Forces through the deployment of cruise missiles on attack submarines. With your continued support, we can predict with confidence that the sea based leg of the Triad will be an extremely viable, survivable, and endurable force into the 21st century.

Senator WARNER. Mr. Secretary?

Mr. PAISLEY. I think at this time I would like to ask Admiral Webber if he would present his statement.

STATEMENT OF REAR ADM. JAMES WEBBER, VICE COMMANDER, NAVAL SEA SYSTEMS COMMAND

Admiral WEBBER. All right, sir. It is a pleasure for me to appear here again, Mr. Chairman. I also request your permission to submit my statement for the record and to summarize it today.

My statement really is divided into two parts. The first portion deals with the GAO report on progress of Trident submarine shipbuilding and the second addresses the Navy's assessment of the Electric Boat capability and the desirability of the two Trident submarines included in the President's fiscal year 1983 budget.

The GAO report came to three conclusions: that quality-assurance problems continue at Electric Boat; that cost growth would likely continue; and that unless unfavorable manpower trends were reversed, schedule delays would occur in the future.

Regarding the quality-assurance problem, the Navy does not agree with the conclusion that the quality-control programs of Electric Boat are defective. Electric Boat has taken significant actions at the Navy's urging and with the full cooperation of the Navy to upgrade their entire quality control program. The Navy has reaudited this program on two separate occasions, and the results show that on the whole the Electric Boat program is satisfactory. The Navy has taken actions to enhance quality control and inspection oversight by the Navy supervisor's office at Electric Boat. The ships being delivered are of excellent quality.

Regarding cost growth, the Navy considers the GAO conclusion that the Navy has fueled the cost-growth controversy is in error. The Navy has estimated carefully, and included in the budget its best estimate of what the costs would ultimately be. We now feel we have realistic cost projections in the budget.

Regarding schedule delays, the GAO statement is that unless corrective action is taken that some further schedule delays are possible. The Navy agrees with this conclusion.

Now, regarding the fiscal year 1983 *Ohio*-class construction program, as you know, due to concern over Electric Boat's performance, the 10th *Ohio*-class submarine was deferred from fiscal year 1982. In addition, last spring the Secretary of the Navy deferred exercising the option for the ninth Trident. Based on progress being made at Electric Boat, a new contract was negotiated and the ninth Trident is under contract.

Corrective actions have been taken in the quality-control area and we feel that problem is behind us now. A major breakdown of the quality control system at Electric Boat should not recur.

The Navy is concerned over the reduction in manpower and lack of overall productivity gains at Electric Boat. I would point out that Electric Boat this past year delivered a total of seven submarines, a feat unprecedented in any construction yard: six *Los Angeles*-class submarines and the first *Ohio*-class submarine.

Regarding schedules, the interval between the 8th and the 9th Trident is 14 months. Therefore, it is possible for some schedule delays in the near-term Tridents, not the immediate ones, to occur before the 8th and 9th Trident schedule is affected.

Regarding the second Trident in the fiscal year 1983 program, the Navy now holds firm priced options for two additional Trident submarines. Prices have been negotiated and agreed to by the Navy and the shipbuilder. There are committed delivery dates of August 1988 and April 1989. To avoid the possibility that a break in production would occur, which would entail a significant increase in program cost, the Navy feels that the options for the 10th and 11th ship should be exercised. I would point out that the decrease in cash outlays should the 11th *Ohio*-class submarine be slipped from 1983 to 1984 would only come to $11 million in fiscal 1983.

In summary, the Navy considers the submarine construction program is on a solid basis. A total of eight submarines were delivered to the Navy in 1981, a *Los Angeles*-class submarine by Newport News and seven by Electric Boat. During 1982, Electric Boat will deliver two *Los Angeles* class submarines and a second *Ohio*-class submarine. We feel confident of that. In addition, Newport News will deliver two *Los Angeles*-class submarines in accordance with their schedule.

Trial results for the *Ohio* have been excellent. The ship has exceeded its design goals and is a fine submarine. I would strongly recommend a steady procurement of *Ohio*-class submarines to contribute to a smooth and steady production line at Electric Boat.

[The prepared statement of Adm. James H. Webber follows:]

PREPARED STATEMENT OF REAR ADM. JAMES H. WEBBER, USN, VICE COMMANDER, NAVAL SEA SYSTEMS COMMAND

Mr. Chairman and distinguished members of the subcommittee, I am Rear Adm. James H. Webber, Vice Commander of the Naval Sea Systems Command. It is a pleasure to appear before you to discuss the Navy's response to the General Accounting Office (GAO) Draft Report, "Cost Growth and Delivery Delays in Submarine Construction at Electric Boat are likely to Continue." I will discuss also Electric Boat's ability to construct the two *Ohio* Class submarines in the President's fiscal year 1983 budget.

With regard to the GAO draft report, the Navy's comments have been incorporated into a Department of Defense letter dated February 26, 1982 to the United States General Accounting Office. The draft report summary states, "GAO found that (1) although the Navy and Electric Boat have taken steps to improve their quality assurance problems, they are still defective, (2) cost growth on the SSN 688 and Trident contracts will likely continue, and (3) schedule delivery dates for both programs will be missed unless unfavorable manpower and productivity trends are reversed." The GAO recommendations contained in the summary are "that the Secretary of Defense require that action be taken to (1) correct the deficiencies identified in the Navy's and Electric Boat's quality assurance programs, (2) develop and use realistic cost estimates in order to effectively manage and control costs and measure performance at Electric Boat, and (3) develop plans for adequately manning the shipyard to reverse unfavorable manpower and productivity trends."

QUALITY ASSURANCE PROGRAMS

With regard to the finding that both the Navy's and Electric Boat's quality assurance programs are defective, the Navy does not agree that the programs are defective. Electric Boat has initiated significant efforts to upgrade the contractor's quality control program. Similarly the Navy has taken the necessary steps to improve the basic contractor quality program surveillance in all major construction processes. While there is room for further improvement in both quality assurance programs, the Navy's and Electric Boat's quality assurance programs are considered satisfactory, meet contractual requirements, and are correcting identified weaknesses. The Navy's quality program ensures contractor compliance with requirements through surveillance audits and selected sampling inspections. Submarines accepted by the Navy from Electric Boat are safe and reliable ships.

COST GROWTH

The GAO states their finding that cost growth on *Los Angeles* Class and *Ohio* Class contracts will likely continue is based on Electric Boat consistently understating the single largest cost element in submarine construction—direct labor. The GAO states also that the Navy has known this but fueled the cost growth controversy by using Electric Boat's unrealistically low estimates to establish original and updated contract costs and baselines for cost growth measurement.

The Navy agrees that Electric Boat's estimates of direct labor hours have been consistently understated. However, the Navy disagrees with the report's assumption that contract cost at completion exceeding target cost equates to cost growth, as well as the conclusion that the Navy contributes to cost growth by knowingly entering into contracts at target costs which are understated.

SCHEDULE DELAYS

With regard to schedule delays, the GAO draft report correctly concludes that corrective action is necessary to prevent further schedule delays. The Navy agrees that scheduled delivery dates for some of the remaining submarines under contract at Electric Boat are in jeopardy unless unfavorable manpower and productivity trends at Electric Boat are reversed.

FISCAL YEAR 1983 "OHIO" CLASS CONSTRUCTION

I will discuss now the ability of Electric Boat to build the two *Ohio* Class submarines in the President's Fiscal Year 1983 budget. As you know, concern about Electric Boat's performance resulted in the deferral of the tenth *Ohio* Class submarine during congressional review of the fiscal year 1982 budget. This same concern prompted the Secretary of the Navy not to exercise an existing option for the ninth *Ohio* Class submarine pending improvement in Electric Boat's performance. Electric Boat had experienced a number of quality control problems that contributed to delays in delivering both *Ohio* Class and *Los Angeles* Class submarines. Corrective actions have been completed or are underway for affected ships under construction. Although some improvements in the Electric Boat Quality Assurance Program are needed, the Navy considers that continued compliance with the contractor's existing quality program will preclude major breakdowns of the types previously experienced by Electric Boat. Therefore, a major problem which contributed to the earlier delays in delivery dates had been largely resolved.

The Navy's assessment of the situation at Electric Boat projects delays in some *Ohio* Class submarines beyond the contract delivery dates. This assessment assumes that Electric Boat will maintain the current work force and will apply manpower as necessary to maintain the current *Los Angeles* Class delivery schedules. The Navy's assessment is based on the past year's reduction in manpower and the lack of overall productivity gains at Electric Boat.

The interval between contract delivery dates of the eighth and ninth *Ohio* Class submarines is fourteen months. This is six months longer than the eight-month interval between the preceding six submarines. Given this longer interval, it is possible for Electric Boat to achieve the contract delivery dates for the ninth and subsequent *Ohio* Class submarines even if delays of up to six months are experienced for the preceding several submarines.

Significant benefits would accrue to the Government by authorizing the second *Ohio* Class submarine (eleventh submarine) in fiscal year 1983. These benefits: First, permit the Navy to exercise a firm priced option for two submarines that is part of the award completed this past January for the fiscal year 1981 *Ohio* Class submarine. The contract delivery dates for these two submarines, if the option is exercised, are August 1988 and April 1989 respectively; second, avoid the possibility that Electric Boat would elect to sustain a production break, thereby adding greater confidence to achieving contract delivery dates; third, avoid a significant increase in program costs due to inflation and breaks in production; and fourth, deliver to the Navy the eleventh submarine earlier than it would be if that submarine were deferred until 1984. Also, the twelfth submarine could be delivered at least eight months earlier if authorized in fiscal year 1984 rather than fiscal year 1985.

The estimated differences in outlays should be the eleventh. *Ohio* Class submarine not be authorized in fiscal year 1983 amount to $11 million in fiscal year 1983 and $41 million in fiscal year 1984. The benefits that can be gained from earlier deliveries and significant cost savings far outweigh the relatively small outlay reductions.

In summary, the Navy's submarine construction program is improved. A total of eight submarines were delivered to the Navy in 1981, one of the *Los Angeles* Class by Newport News and six of the *Los Angeles* Class and USS *Ohio* (SSBN 726) by Electric Boat. The Navy projects that during 1982 Electric Boat will deliver two *Los Angeles* Class submarines and one *Ohio* Class, and Newport News will deliver two of the *Los Angeles* Class. Submarines delivered to the Navy are quality products, safe and reliable. Trial results for the eight submarines delivered in 1981 were excellent as substantiated by the Board of Inspection and Survey.

I consider a steady procurement of *Ohio* Class submarines to be essential. I also consider that Electric Boat has the capacity and capability to support the construction of the two fiscal year 1983 *Ohio* Class submarines now in the President's budget.

Senator WARNER. Admiral Webber, I think we will proceed with the questions right now.

The subcommittee and the committee as a whole has received testimony which justifies the need in the fiscal year 1983 budget for two *Ohio*-class Trident submarines. However, as you know, we are faced with an overall budget problem here at the Congress. And while I do not predict nor the question does not indicate that, should it be the intent of the Senate to cut the defense budget—and I hope that does not occur, but if it does—perhaps some of the procurement programs would be impacted.

What I have to do is put in the record the consequences, which I assure would be negative, of the cancellation by the Congress of the second *Ohio*-class submarine in fiscal year 1983. Would you address the contractural consequences of such an action by the Congress?

Admiral WEBBER. Yes, sir. We presently hold fixed priced options for two additional Trident submarines. Those options must be exercised by February 1983. If one of those options is not exercised, it will lapse. That ship would have to be repriced with a later pricing date and a break in production the contractor's plant could occur. We would have to modify his orders to his subvendors, reissue his job orders; readjust his schedules, and change planning.

We estimate a very significant increase in cost due to the break in production. That is a short summary of the contractural and business impact.

Senator WARNER. There would also be an impact on work costs, would there not?

Admiral WEBBER. Yes, sir, the second submarine would commence approximately 1 year later, and it is our estimate that it would be delivered at least 4 months later. Therefore, there would be an adverse impact, particularly on the work force.

Senator WARNER. Is there any consideration to have a second yard involved in the Trident construction program?

Admiral WEBBER. We have considered that in the past. There is a significant investment in facilities to build Trident submarines due to the size of the ship. We have solicited other companies such as Newport News. However, due to the expense of starting up a second facility, that has not been done.

Senator WARNER. Well, you say it has not been done. There is no decision by the Navy Department at this time for further consideration of a second?

Admiral WEBBER. That is right.

Senator WARNER. It is a dead issue?

Admiral WEBBER. It is a dead issue.

Senator WARNER. Mr. Secretary, who is next?

Mr. PAISLEY. I think we at this time would like to take on any additional questions that you might have to any of the members here, including some of the support witnesses, if you would like at this time.

Senator WARNER. Would Admiral Clark like to make an opening statement?

Mr. PAISLEY. We do not plan for either one of the support witnesses to submit, or they have not prepared a statement. But I see no reason at this time, if you want to make any comments about the program, Admiral.

Senator WARNER. Well, bear in mind that the general public is anxious to know about the defense programs, while those of us who have been in it for years and understand the reasons that tend to slip into private conversations want to share this as much as possible with the general public. We would appreciate it if you would outline what you have been doing for the past year and what you expect to do in the coming year and what budget items in there are of importance to you. Presumably all of them.

Admiral CLARK. Senator, I can comment that the D-5 was initiated in fiscal year 1981. It is proceeding very much in accordance with the plans that were laid out at the outset of fiscal 1981. I think you are aware of some delays in funding availability in fiscal year 1981 and fiscal year 1982. Those have now been resolved.

We now have the full request that we made for both years. While that has caused some compression of our technology work, I do not think that has had any truly significant impact on our progress, and we now are proceedding pretty much on schedule in most important and critical areas toward the plan that we had previously outlined to you.

Certainly, in closed session we can discuss in more detail, if you wish, some of the classified elements of the D-5 program. I would remind you that we have 1 more year of advanced development now planned in fiscal 1983. That is our last year of advanced development. At that point we will be in a position to make detailed decisions on the weapons system configuration and firm up the performance objectives, and I think predict the full-scale engineering and development costs with reasonably high confidence.

In the present plan we call for beginning full-scale engineering and development in fiscal year 1984 and we are still very much on that plan.

Senator WARNER. Admiral Clark, you may not want to answer this question, simply because your reponsibilities may be entirely in the technical area and I am not certain whether or not some of it overlaps into the strategic plan. But there is a good deal of debate here in the Congress on the D-5 at sea, the D-5 being recognized as a hard-target-deterrence weapon.

The argument is made that doing so will jeopardize the stability of the strategic balance, thereby raising the probability of some outbreak of a nuclear exchange, or its hairtrigger, constantly used.

Is this in your area of expertise?

Admiral CLARK. No, sir; as a program manager, I think I will defer that question to someone else.

[Additional information follows:]

Although the Administration's START policy is not within my area of responsibility, I can tell you that our policy is under review. Your question should be addressed to the Under Secretary of Defense for Policy for a statement by the responsible individual.

Senator WARNER. I am not sure that you have a panel here——

Mr. PAISLEY. I am not prepared to answer it.

Senator WARNER. I accept that. I accept that, because I think sometimes we put these questions to the panel and they feel an obligation to deal with them. Leave it to the strategic analysts. We have other opportunities for that question to be answered during the course of the year.

Admiral Clark, we are going to probe further here on this question of the timing of the D-5 or Trident II program. You use those terms interchangeably, Trident II and D-5, do you not?

Admiral CLARK. Yes, we do.

Senator WARNER. What specific management steps and other initiatives are being considered as a means to achieve such acceleration? And quite frankly, in your personal and professional opinion, is this acceleration achievable?

Admiral CLARK. Well, as Mr. Paisley indicated, we are examining that feasibility right now. And while some acceleration seems feasible and in fact we have indicated that to this committee in previous testimony, at present the questions, the real questions, are what are the implications of it, in terms of funding profiles, in terms of any compromises that we might have to make on the performance of the weapons system.

And it is those things that we are now actively engaged in investigating, and I would expect that we will be in a position within several weeks at least within the Navy to report the results to the Secretary of the Navy.

Senator WARNER. Well, I would think so. How long have you been working on that issue? He talked about it last year.

Admiral CLARK. We had previously reported to you, I think in our last testimony, that some acceleration was possible in accordance with some sort of funding ground rules. Of course, the particular requirement was the need for 1982 money to produce that acceleration. Of course, fiscal year 1982 is here now and we are looking at it without that increase in the fiscal year 1982 funding. That makes it more difficult.

We started this current investigation just about 1 month ago, and we will soon finish it.

Mr. PAISLEY. May I say something on that, Mr. Chairman?

Senator WARNER. Yes, feel free, Mr. Secretary. This is an exchange to open up the dialogue.

Mr. PAISLEY. I think we are looking at this from a very positive fashion, what can be done, what does it mean if you do these things, what are the risks involved, what are the costs involved. I think I see a habit within the program to say, this program is reduced in length and therefore it is more expensive and the risk is higher. Now, on the surface that is a conclusion one can draw rapidly, but not always draw well. If a program is sometimes too long, the risk is sometimes larger. We engineers, we know how to invent, and once one decides what a requirement is, you should rapidly draw up to solve that requirement in the minimum length of time. I am not saying that there are not risks involved by reducing it, but I am not saying there are, either. And that is the thing we are examining.

I have a feeling that this program, properly laid out and accelerated, is a lower cost program. It is going to cost the country less, because the length of the program, as presently conceived, has an IOC in 1989, which is about 7 years. And I think that there are a lot of things that can be done to meet the requirements of the system to put in some concepts of a backup program to protect the risks, and in the end it is going to cost us less, it is going to get us what we need sooner.

And so I have high hopes that the results of this study will be very positive, and I look forward to taking them through the Navy and eventually bringing them over here.

Senator WARNER. But is there any thought to compromise some of the performance characteristics, namely the accuracy?

Mr. PAISLEY. No; actually, the two things we are trying to protect in the planning is—one is reliability. I think you cannot compromise yourself on reliability. I think if there is any degradation in accuracy that we can see from any program, we have to show that there is a program to protect it with a secondary program. That is what we are looking at now.

But primarily, we have a hard line on reliability. I think—you know, I go back, way back, on these kind of programs, and I remember when we put Polaris in and put Minuteman in. We probably put those programs into the field with a lot less reliable capability than we wanted, but they were a very effective deployment. They accomplished a lot. However, over the period of time that these systems have evolved, one thing we have learned is that you have to be very careful about reliability. That is a difficult thing to get once you have lost it. So we are paying a lot of attention to that.

Senator WARNER. The chairman desires to put into the record a response to a question that I put several weeks ago to another Navy panel, and that was the cost growth in the Trident submarine program and the breakdown that was provided. Now, which Admiral desires—Admiral Webber, Admiral Kelso?

Admiral WEBBER. Yes, sir, I will attempt to answer it.

Senator WARNER. Now, the $1.5-plus figure that you put in here, $1.5 billion, $674 million was attributed to economic cost increases, $286 million to estimating adjustments, and $626 million to schedule changes.

Admiral WEBBER. Yes, sir.

Senator WARNER. Now, what assurance can you give us there will not be a repeat in the future of these situations?

Admiral WEBBER. Mr. Chairman, now that the leadship has been completed we have a better understanding of the estimates and we feel that the estimates for the man-days that are presently included are adequate. The Navy estimates are somewhat higher than Electric Boats estimates, and we have included our estimates in the submittal.

Senator WARNER. Is it the committee's understanding that to date no cost growth has been experienced in the eighth and ninth Tridents?

Admiral WEBBER. Yes, sir, that is correct. As I mentioned, unless actions are taken by the company to increase their manning on some of the Tridents, not the ninth nor the next ship to be delivered, but the middle submarines, there is a possibility of some schedule slippage.

Senator WARNER. And if the Congress does not authorize the 11th, I suppose there is some likelihood that the contractor will redistribute overhead, manpower costs back?

Admiral WEBBER. Yes, there is always the possibility that he would attempt to level out his workload by covering that period, and extending delivery dates.

Senator WARNER. So again, this budget for fiscal year 1983 reflects efforts by the Department of the Navy in its shipbuilding program, principally the Trident and the CVN program, to obtain the additional ships at a lesser cost by ordering it in numbers?

Admiral WEBBER. Yes, sir, it also supports and maintains a steady production line in the shipyards.

Senator WARNER. Steady production.

Admiral WEBBER. Yes, sir. That is very important to a shipbuilder.

Senator WARNER. And the present shipbuilding program is predicated on the authorization of these two ships by the contractor. And if the Congress fails to do so we can expect a perturbation in this contract and additional costs on a single ship at the yards for fiscal year 1983.

Admiral WEBBER. Yes, sir. In the past we have learned very expensive lessons from the bad effects of the peaks and valleys in the shipbuilding program. The second Trident in the fiscal year 1983 program really sustains an average one per year rate that has been in existence after 1975.

Senator WARNER. So really it is leveling it out.

Admiral WEBBER. Yes, sir, and we would strongly recommend that we maintain that rate.

Senator WARNER. Well, I agree with you on that. We ought to do our very best to make a strong case with our colleagues on the Senate side.

Senator Levin?

Senator LEVIN. Thank you, Mr. Chairman.

In reference to the D-5 missile, is that adaptable for a land launch and are we looking at it now for that purpose, Mr. Paisley?

Mr. PAISLEY. I think I will defer that question over to Admiral Clark. I know in the past they looked at that a lot.

Admiral CLARK. Certainly the D-5 missile could be built to be compatible with a land-based basing system. I would point out, though, that one really should start out the program with that in mind and with that basing system defined if you are going to be able to do that, because it does impact on the design of the missile.

And you may know, about 4 years ago we looked at, at the direction of the Secretary of Defense, a common missile between the ICBM and the SLBM force, and we did investigate that feasibility and determined what the performance would be. At that time the Secretary of Defense determined he did not want to build a common missile.

Senator LEVIN. Are you saying that presently we are not looking at the possibility of the D-5 for a new land-based missile?

Admiral CLARK. At the present time I am not looking at that.

Mr. PAISLEY. Senator, let me say something. I cannot say the Department of Defense is not. We in the Navy of course would not normally be doing that. So within the Department of Defense that may be going on.

Senator LEVIN. You would not necessarily know about it?

Mr. PAISLEY. I do not know about it. I could not say that it was or was not.

Senator LEVIN. But it is possible, though, that it is being looked at without you knowing about it?

Mr. **Paisley**. Yes, and I would think if they are going to look at it in any detail using this specific missile and changing it or reconfiguring it, the Admiral would know it. You would have to get the data from him. So I would think that if there was any studies going on the data would have to come from some of his people.

Admiral **Clark**. One cannot go very far with that investigation without getting us involved in it.

Senator **Levin**. And you are not involved in it?

Admiral **Clark**. We are not presently involved in such a study.

Senator **Levin**. I wonder what Lt. Gen. Kelly Burke, the Air Force R. & D. chief, meant the other day when he said they were looking at that D-5.

Senator **Warner**. Maybe conceptually.

Senator **Levin**. First he said they were not looking at it, then he said they were.

I know you have absolutely nothing to do with the continuous patrol aircraft, but I am just curious. Do you know anything about that, Mr. Secretary?

Mr. **Paisley**. I know about it. I was not in the Government and almost everything I know about I read in the paper.

Senator **Levin**. How about Admiral Clark. Do you know anything about that?

Admiral **Clark**. No, sir, only what I read in the newspaper.

Senator **Levin**. Admiral Kelso?

Admiral **Kelso**. No, sir.

Mr. **Paisley**. You know, I want to tell you something somebody told me before I got in Government. They said, one thing you are going to have to watch in the Navy: they tell several stories. But they were pretty good on this issue today. We are only telling one story.

Senator **Levin**. I would like to ask you a question just based on what you have read in the newspapers.

Here is my question. I have been leading up to this with great flourish.

Senator **Warner**. Before you commence, Senator, I made clear to the Secretary—this is his first experience in testifying—that often times an error is made by witnesses in speaking to subjects for which they are not qualified. And if you want to talk about some general knowledge—

Senator **Levin**. Well, this is directed at just general knowledge based on what you know.

Would you say that we would be maintaining the Triad if we went with a continuous patrol aircraft?

Mr. **Paisley**. Say that again, would you, so I would be sure I understand it?

Senator **Levin**. Well, we are looking at a number of ways to base a new land-based missile; we are looking at a continuous patrol aircraft; and a deep underground basing; and basing protected by Ballistic Missile Defense. And my question is, if we decided to go with a continuous patrol aircraft, would that maintain the Triad in your opinion?

Mr. **Paisley**. You know, I could not answer. Even my opinion on it would not be very good, and let me tell you why.

Senator **Levin**. I will accept that to save time.

Mr. PAISLEY. You have to understand what they are going to do with the system. I do not understand the capability they are talking about putting in the airplanes.

Senator LEVIN. How about you, Admiral Kelso? You do not have an opinion?

Admiral KELSO. No, sir.

Senator LEVIN. Admiral Clark?

Admiral CLARK. I think I would agree with Mr. Paisley on that point.

Senator LEVIN. OK. Let me then ask you some questions that you might be able to answer.

Back in 1979 Dr. Perry, who was then the Under Secretary of Defense, told this subcommittee that he did not project that the Soviets would be able to develop a system to localize our SSBN's during the decade of the 1980's. Dr. David Mann, who was the Assistant Secretary of the Navy for Research and Engineering, agreed with Dr. Perry's assessment of the Soviet ASW development and even went further by stating: "Yes, I agree with it, provided there is no implication that in the 1990's that they will develop such a capability."

When I asked Dr. Mann, "No earlier than the 1990's?" he responded: "No earlier than that, yes."

Admiral Kelso, let me ask you a question first. Have there been any developments in the Soviet threat to our missile submarines to change this assessment?

Admiral KELSO. Not to my knowledge.

Senator LEVIN. Each year I ask the Navy's top admirals, the Chief of Naval Operations, assistant secretaries, and everybody else I can get my hands on Navy the following question. Since your appearance before the committee last year, has there been any change in the Soviet threat to our strategic ballistic missile submarines in terms of greatly improved Soviet antisubmarine warfare capabilities? Admiral Kelso?

Admiral KELSO. None to my knowledge.

Senator LEVIN. Does the Navy still consider those missile submarines to be invulnerable against the Soviet threat at the present time, and does the Navy still expect that the submarines shall still remain invulnerable against the Soviet ASW threat at least until the end of this decade?

Admiral KELSO. Yes, sir.

Senator LEVIN. Mr. Paisley or Admiral Clark, if you have any difference with those answers, would you speak up. Do you have any difference with those answers?

Mr. PAISLEY. No, I do not.

Senator LEVIN. Now, last February in response to my question the CNO responded as follows:

> There has been no change in our assessment of the Soviet threat to our strategic missile submarines. We continue to believe that Soviet antisubmarine warfare forces are not now an effective counter to U.S. SSBN's. We believe that Soviet ASW capabilities will improve, but that introduction of the Trident missile and Trident submarine with the correspondingly expanded operating areas and improved acoustic quieting will provide continued survivability.
>
> We believe the Soviets have little prospect of developing new systems capable of effectively detecting and tracking U.S. submarines in broad ocean areas in the foreseeable future.

Do you agree with that statement?

Admiral **Kelso**. Yes, I do agree with that statement.

Senator **Levin**. Last year Admiral Carter, head of the Navy's strategic and nuclear warfare division, testified that "antisubmarine warfare is a war of attrition. Given a capability it takes time, weeks or months, to detect and localize any significant portion of a submarine force."

I then asked him:

> Would you agree that, despite the expenditure of billions of dollars the Russians have made in past decades to improve their ASW capabilities, that they have failed to develop such a detection and localization capability required to successfully attack and destroy our strategic missile submarines?

He responded: "Yes, sir, I believe that is true."

Would you agree that is true?

Admiral **Kelso**. Yes, sir, I do.

Senator **Levin**. Last question, Mr. Chairman, if I can, and that is, the statements that you have just made or agreed to about the lack of Soviet success in developing detection and localization capabilities required to successfully attack and destroy our strategic missile submarines, despite years of investments of billions of rubles, does that apply both, Admiral, to Soviet efforts in acoustic and nonacoustic ASW detection?

Admiral **Kelso**. Yes, sir.

Senator **Levin**. Thank you, Mr. Chairman.

Senator **Warner**. Let me make sure that the record, in the light of full day after this hearing, I think puts a balance on this situation. Indeed, you have acknowledged the relative—and I think we had better insert the word "relative"—invulnerability of the sea-based leg of the Triad. If you look at that question—and I do not suggest that the Senator did not draft well—but if you look at it as you answered it, I think you almost indicated that the sea leg is invulnerable. And you did not mean to indicate that, did you, Admiral?

Admiral **Kelso**. I agree with you. When you speak of invulnerability, you speak of something relative, because none of us is smart enough to know what is going to happen forever. I do not think that any of us would ever project that we are capable of doing that, nor would I like to project that we have our head in the sand and do not look continuously to see what the future might hold from the standpoint of submarine vulnerability.

Putting a simple stamp on it, when you say, do you think the vulnerability is relative, I look at it very much that way, and in a very simple sense. when you say vulnerability in relation to anything else, I think, yes, the submarines are going to be the most invulnerable of all you look at, because in order to make submarines a vulnerable platform you have to develop a technology that is good enough on a continuous basis to put the entire force at risk all the time.

If you look at any other system you want to, there at least is a technology available to you today that people know how to use to locate it. If any of them are ever vulnerable, in my opinion, the submarine is going to be the last one. I cannot say, because I do not have a crystal ball to look into the future that it is never going to be.

I do not foresee it being, but you know, I cannot say it will not be. But it will be the last one of any of the types of systems we have looked at for strategic weapons, in my opinion, to ever get to that point.

Now, the thing that I think is important to understand is, when we say invulnerability of the strategic submarine force, we are not saying that there never will be a case in time when you could not lose one submarine or something like that. We try to look ahead to see what we need to do to counter what could come in the future and to be in advance of that.

And the sort of things we try to do is to build our submarines better; as we talked about, *Ohio* is a quiet submarine. That was one of the major things in the design of that ship, to make it better than the previous ships.

At the same time that has been occurring there have been advances in acoustic detection capabilities of both sides of the fence. But we have sort of balanced that as we went along. So, as you look at the submarine and relative invulnerability for the future, you have got to continuously do things to counter what the other side might be able to do in technology. And that is, by being invulnerable, is that you have to take that entire issue into account.

It is a move and a countermove from the standpoint of technology to remain invulnerable. If you are willing to sit and do nothing in any weapons system, I think history would tell you that eventually it will be vulnerable. So, you have to look at technology and what the best scientists in this country look at for us, and give us opinions on, as to what we need to do in areas to continue to maintain the submarines invulnerability.

If we do not do anything, I think yes, some day submarines would become vulnerable. But I think by keeping ahead of the problem we can maintain its invulnerability, and that is what I mean when I say yes to Senator Levin's question.

Senator WARNER. The questions were quite properly directed to the issue of whether this Nation has reached that point, as a consequence of fiscal and other constraints, of abandoning the Triad concept. In view of the relative greater invulnerability of the sea-based leg, perhaps America no longer needs a land-based leg, in view of the relatively greater vulnerability of that system for the present time.

Now, the Secretary of the Navy when he appeared before us underscored his judgment that we have not reached that point in time in our history where we should provide any less emphasis on a clearly defined Triad concept.

And it has been my observation in better than a decade of working in this area that a number of countries are working on ASW problems and solutions. Far more research is being done in this area than in other areas. For example, your smaller countries in NATO, in the Benelux areas, the Danes, the Germans, and now perhaps even the Japanese, are joining to do research work in ASW.

And I remember ever so clearly—I suppose it is still quite classified—an absolutely shattering experience after about 2 or 3 years in the Department of Defense as a consequence of a set of scientists in a remote country coming up with a set of equations that nobody could provide answers for. Eventually, that too proved to be not a major breakthrough for ASW, but for a period of time a number of people were concerned.

So I just point out that, while we can take rightful pride in the progress America has made in the sea-based strategic leg, by no means is that invulnerability, relatively speaking, something that, it certainly is my judgment, would at this point in time justify this country from departing from the Triad concept.

Do you agree with that?

Mr. **Paisley**. Yes. Let me say, I surely do agree. Let me say a little more about it and try to throw a little more light on your question. I know you have asked it of enough people that you are very interested in the answer, and I would like to give you as much visibility as we can associate with it.

I have not been in the Government very long, and I see this problem being worked very hard, this matter of keeping our position in terms of vulnerability of this segment of the Triad. I think—and I am going to call on someone, if I might, to talk briefly on this who is an expert in the ASW area—my personal opinion is we are starting to get more nervous. We are working harder. That is a reflection of my opinion of the technical people's concern about what they see. And what we have to do—and you cannot quantify it in terms of numbers, but you can quantify it in terms of feeling that things are drawing closer and we have got to work harder.

I wonder if I might at this time call on Gerry Cann to say a few things about this.

Senator **Warner**. I am glad you did, Mr. Secretary, because Secretary Cann is well known to the committee and we have a very high respect for his knowledge in this area.

Mr. **Cann**. Mr. Chairman, with regard to the submarine versus ASW forces issue, on both sides detecting submarines is difficult to start with. It always has been. And as this committee well knows, we spend a great deal of time attempting to come up with ASW schemes and systems and force levels to defend our own fleet against Soviet submarines.

The first thing I should like to point out, recognizing that this is an open hearing, is in my judgment our submarines are certainly more difficult to detect. I believe that we have much quieter submarines than the Soviets. And yet, we find it very difficult to routinely detect, tract and otherwise deal with Soviet submarines. I believe they find it very difficult to do the same with ours. We have had a very comprehensive ASW effort going on relative to the Soviet threat, as you well know. This has tremendous spillover in terms of our ability to prognosticate and understand what the threats to our own submarines are by the Soviets. In my judgment, while we have to be very concerned, about technological breakthroughs and tactics and concerns, it is always possible to find a submarine or catch a submarine, but with respect to the total force I think it would be a very remote possibility that you could put the SSBN force at risk in the foreseeable future.

Senator **Levin**. Would you yield, Mr. Chairman, just for one moment?

Senator **Warner**. Of course.

Senator LEVIN. Is it fair to say that we are considerably better at ASW than the Russians?

Mr. CANN. In my judgment, I believe we are considerably better.

Senator LEVIN. We hear frequently that we are behind on everything, Mr. Chairman. Once in a while it is good to hear that we are ahead on something. It gives us a little balance. I do not think it would make us feel a whole lot better.

Senator WARNER. I think that is well taken.

Senator LEVIN. There are a few other areas of U.S. superiority. I could rattle off, too. As a matter of fact, there are a few dozen. But I think this is just one we should highlight at this time

We have trouble tracking our own submarines, as I understand it. You would agree with that, would you not, Mr. Cann? We have trouble tracking our own submarines with our own ASW?

Mr. CANN. Yes, sir.

Senator LEVIN. You know, I am intrigued by one thing, Mr. Chairman. We talk about this continuous air patrol as though it is the answer to our land-based vulnerability, and it seems to me that submarines are just as much subject to land-based vulnerability as a patrol plane. I do not understand. Maybe there is a simple explanation.

That is why I ask these gentlemen at the table. I know they are not experts in it, and I certainly am not. I am just curious why we all so blandly look at that continuous patrol alternative for the MX or some other missile as though that preserves the Triad. Why does that preserve the Triad any more than putting them in submarines? But I am sure there is an answer to that that I overlook.

Senator WARNER. Well, I think it is important that we spend a few more minutes on that question, Senator, because it is one that our colleagues will have to examine on the complete record on it. But as you know, a land-based system, quite apart from the issue of vulnerability, has a higher percentage of what they call up time, ready time, simply because of the character of the installation: It is always there, with the exception of routine maintenance. It is presumably on status to retaliate, where the submarines are on their patrols and they come in and there is a period of time when they are down, so to speak, in terms of the deterrent force.

But we get right back to the threshold question that at some point in time somebody might make a dramatic breakthrough. We have got the overhead space systems coming on. We have got improved understanding of thermal systems in the ocean, currents, any number of things that have to be considered.

Senator LEVIN. As the admiral points out—I think it was the admiral who points out—the chances of that happening are a lot less likely with submarines than they are with aircraft. That is the last thing.

Senator WARNER. That is what we think today.

Senator LEVIN. Well, we have been thinking that way for decades, and I think logic dictates to us we are going to increase the size of the ocean areas in which our missile submarines can hide. If we put those Trident II's in there—I think it is a classified figure?

Admiral KELSO. You increase your patrol factor.

Senator LEVIN. And now we cannot find our own subs with our own ASW. I mean, you put planes on the ground; you talk about photographic devices in space.

What intrigues me, though, is we have looked at the continuous patrol aircraft as though that is the answer to the land-based vulnerability. And I do not know why that preserves the Triad. That is my question. Why does that preserve the Triad?

In terms of "up time" availability for combat we can get subs more up time than we can for patrol planes if we want. That is just a matter of how much we have them out on patrol. Anyway, I do not want to get the subcommittee off in an area that it was not planning on going this morning.

Senator WARNER. No, I think the subcommittee definitely would come in before the Senate trying to justify to our colleagues the expenditures of two Trident submarines, among other things, a continuation of the D-5 and the Trident II program.

Senator LEVIN. I am not raising questions about either of those. As a matter of fact, I am intrigued because we are looking at—according to testimony from Gen. Kelly Burke, we are looking at the D-5 as a land-based missile possibility.

Senator WARNER. The point is, we make decisions today that guide us almost a decade in the future in these major strategic systems. And we simply thus far, and I believe in the foreseeable future, should not say that our knowledge of ASW technology is so positive that we can establish planning precedents now to eliminate the Triad system.

Senator LEVIN. I am not trying to eliminate it. I look to preserve it. But if we cannot preserve it, why are we going and looking at patrol planes and not submarines for basing the MX? That is my only question. Why does the MX on continuous patrol aircraft preserve the Triad?

Senator WARNER. Well, all of us have had some concern, as well as Chairman Tower, on the Big Bird concept, that it is something we should study. It is too important.

Senator LEVIN. Thank you, Mr. Chairman.

Senator WARNER. That is all right. I think it is a valuable contribution that you raise it at this point, Senator Levin.

Senator WARNER. Unless there are further questions, Senator Levin, or further statements that the panelists wish to make, it is the intention of the Chair now to go into executive session. Is there any further comment?

Mr. PAISLEY. No.

Senator WARNER. Senator Levin?

[No response.]

Senator WARNER. The clerk will inform the Chair when the room is cleared.

[Whereupon, at 9:37 a.m., the subcommittee was recessed, to reconvene in executive session.]

EXECUTIVE SESSION

Senator WARNER. I understand, Mr. Secretary, Captain Coakley is prepared to address the questions I raised earlier on the hard target kill capability represented by the D-5 Trident II at sea, if you will take that up.

STATEMENT OF CAPTAIN COAKLEY, ACTING DIRECTOR, STRATEGIC AND THEATER NUCLEAR WARFARE DIVISION, OFFICE OF THE CHIEF OF NAVAL OPERATIONS

Captain **Coakley**. Mr. Chairman, I am Captain Coakley, Acting Director of The Strategic and Theater Nuclear Warfare Division.

The question, I believe, related to the destabilizing effect of having a hard target kill capability on submarines. The context in which that has been discussed for the most part has been in postulating that we would be building a system with a depressed trajectory, or low time-of-flight weapon that could be deployed close to the Soviet Union and could be launched in a preemptive strike to attack Soviet bomber bases and missile silos before they could launch their weapons systems. Therefore, the Soviets could perceive that as something that they might have to worry quite a bit about.

Senator **Warner**. A first strike capability.

Captain **Coakley**. First strike capability.

As you know, sir, this system is not being built that way, but they could perceive it that way if they would think that we might deploy a system like that without testing it.

First strike capability requires the capability of the preemptor to effectively neutralize the enemy's entire retaliatory capability. Even if we did have that capability in this system, I don't think it would threaten the Soviet SSBN force or their dispersed bombers, and we would certainly have to in order to preempt. In that case, they would have to deal with the possibility of having to launch under attack.

Stability, in my opinion, sir, is created when there is no clear-cut advantage on either side to attempt a preemptive first strike, and if they should perceive that threat, I think it is outweighed by the fact that in the negative sense, in our way of looking at it Trident II makes a tremendous contribution to crisis stability in that it prevents the Soviets from gaining an advantage, or an unacceptable advantage by a preemptive strike against our land-based forces. It is in the eye of the beholder to a certain extent, but to have at sea a relatively survivable or invulnerable weapon system that is capable of attacking all targets in the Soviet spectrum of targets contributes to stability. His advantage cannot be too great if we have a system that can attack his hardened target systems and defeat his civil defense system, or attack any remaining missiles that he might have in his silos. In that sense, I think the D-5 will provide a more significant contribution to crisis stability than any of the weapons systems we now envision.

Senator **Warner**. Thank you, Captain.

Let the Secretary now add what he wishes in terms of classified.

Mr. **Paisley**. Pardon me, I can't hear you.

Senator **Warner**. We will now in this executive session let you supplement any views that you have expressed during the opening hearing.

Mr. PAISLEY. I think everything that we have covered up to this point in time covers the subject from our viewpoint. It is classified matters that we intended to present.

Senator WARNER. What about an overview of the cruise missile program, Admiral Locke?

STATEMENT OF REAR ADM. WALTER LOCKE, USN, DIRECTOR, JOINT CRUISE MISSILE PROJECT OFFICE

Admiral LOCKE. Mr. Chairman, it is a pleasure to be back again and to report that in 1982 we will achieve the initial operational capability of two variants of sea-launched cruise missiles. Both the conventional land attack and the anti-ship variants will reach IOC this summer coming up for the submarine-launched version and in the summer of 1983 for the ship-launched versions. In the summer of 1984 the nuclear variant of the Tomahawk cruise missile will meet its IOC from both submarines and surface ships.

We have slowed the program down for the conventional land attack version to assure quality. We had set a very challenging schedule for ourselves to have an IOC in January 1982. We conducted a number of quality end process inspections on the missiles as they were coming down the line. We were dissatisfied with what we saw. As Secretary Paisley said, this leads to reliability problem so we felt that reliability was more important than the schedule. We still meet the congressional schedule of having an IOC in 1982.

In addition, in the area of cost, as reported to you in the latest SAR, our program unit cost has gone down 38 percent. That minus 38 percent will be amended to take into account more realistic inflation factors. In our new report the program unit cost reduction will then be minus 27 percent.

If you have any questions——

Senator WARNER. No, that is all right.

Now, Admiral Locke, the committee is aware of various assessments which suggest that cruise missiles like the Tomahawk land-attack missile may be developing some important vulnerabilities to Soviet air defense systems.

How much of a problem does this constitute in your opinion today, and how soon do you anticipate that it will become a critical problem?

Admiral LOCKE. I don't see it as a problem at all today. However; one should expect that their defenses will improve possibly in the middle to late 1980's to react to the new threat posed by these very small, low-flying, small radar cross section vehicles. Accordingly, we have undertaken initiatives that will counter anything we can see that they can possibly accomplish.

Senator WARNER. Like what, ECM?

Admiral LOCKE. I cannot discuss that at this time.

Senator WARNER. Can you comment on relative advantages of sea-launched cruise missiles and sea-launched ballistic missiles in terms of their effectiveness and deterrent value as part of the overall strategic reserve force?

Admiral LOCKE. Sir, the President has designated the nuclear variant of the sea-launched cruise missile to be part of the strategic reserve. These submarine-launched cruise missiles will share the relative invulnerability of our submarine forces. In any case, it does proliferate offensive power at sea to many platforms which thereby create an even greater problem for the Soviet Union or any other potential enemies.

Senator **Warner**. Mr. Secretary and Admiral Kelso, let's return to the ASW. I think you stated in open session rather positively, not that you are going to contradict yourself in closed, but there may be something you wish to add in closed session.

Mr. **Paisley**. Let me call on Mr. Cann again to see if there is anything he wishes to amplify on what he said before.

Mr. **Cann**. I think what I would like to say at this point, is that the whole ASW problem on both sides is getting tougher and tougher. We are clearly building quieter submarines. The Soviets are building quieter submarines. And one of the great difficulties with the process is that our ability to improve our technology, while it has really been amazing, it's just barely keeping up, and the difficulty is even when you have the technology in hand that allows you to detect them, you then have to proliferate it into a series of systems that are useful, and I would have to say that in our efforts to maintain the sea-based leg of the Triad, we have taken very positive and long-reaching steps. The Trident was a very major step forward in terms of increasing the area because that has always been a concern. We have the ability now to go to sea and essentially get lost. I can't overemphasize the concern that we have for technological breakthrough, and there is a very strong formalized effort within the Department of the Navy to continuously watch over this type of activity.

We have two or three very strong committees. One of them is called PSAG, Planning, Steering Advisory Group, which is chaired by Dr. Freeman who is an outside, nationally known expert, and some of us sit on that on a very regular basis. We meet on the average of once a month and review everything that is going on and make recommendations both to the CNO and to the Secretary as to what courses of action should be pursued and make sure that we are spending the proper amount of money in this area.

Senator **Warner**. We are going to go back again to what we had in open session, and that is as we plan for the decade ahead, Admiral Kelso, we certainly would urge that we cannot plan on there being no breakthrough in the ASW. Therefore, we have got to continue the Triad concept.

I don't know whether there is anything classified you want to add to that point. That is a constant dialog, and an increasing one here in the Senate as we look at this MX system which tends to vacilate.

Admiral **Kelso**. I guess my view, Senator, is I don't think I know enough about anything in the world to say that any one weapons system is going to always be invulnerable, and certainly nothing in history would tell that anybody who planned that way could survive forever.

The Triad I think means to me that we have different systems that have had different bases of operation and different types, not necessarily different types of weapons but different weapons of different capability, each of which backed the other one up over the years. They both have some strong points and some weak points if you look at them in great detail. I don't know of anything that has changed that, to tell us that that system that has worked so well for us, we have to say that it has deterred. We have not gone to war during the period of time that we have had that in the sense of ever using them. So I think it in a sense has proved itself.

And I don't know anything that would tell us that we shouldn't continue to follow that logic.

Senator WARNER. Well, I agree, but I just have to have this record and your statements in your record, while I know your answers and I know it is time consuming, but it is important that we have that.

I am going to ask Mr. Gaffney to pose a question or two.

Mr. GAFFNEY. Gentlemen, I think the committee has historically taken a very strong position in favor of the D-5 missile, and that has been the case notwithstanding the concerns of other committees of the Congress and their individual members about the D-5. I think we continue to feel that way.

One of our concerns, however, is over this question of achieving an acceleration of the missile possibly at the expense of performance. As you know, we have been trying to obtain the maximum performance possible in the course of this development program, yet you mentioned, Mr. Secretary, the prospect of compromising the accuracy somewhat initially—or at least looking at the prospect of compromising the accuracy somewhat—and then retrofitting subsequently the missile to provide performance comparable to that hoped for under the present program.

Senator WARNER. Did you say that? I don't remember you having said that.

Mr. PAISLEY. I could amplify on that.

Senator WARNER. I want to make sure the question is not misstating because I didn't understand him to say that.

Mr. PAISLEY. I could talk about your concern on this because I share it and because I understand what the requirement is and what we are trying to do.

Let me give you an example of what I am talking about. If you could achieve an IOC in, let's say, 1987 versus 1989, 2 years difference, and have less accuracy in 1987 but have all of the other parameters and have a backup program, that in 1989 would give you that accuracy, then you have achieved something because in 1989 you get the accuracy you want that you said you were going to get anyhow, but I get the system 2 years earlier. So I think there is an accuracy requirement that you must have in a system. I think that every system we deployed in this area has increased and improved on its performance with time. None of them have decreased with time. So we have no indication that what is going to happen is that you are going to start out with some capability and go downhill. We always improve.

Mr. GAFFNEY. That is precisely the point. It is part of the current review to assess the possibility of achieving an earlier IOC with at least some temporary degradation in the accuracy?

Mr. PAISLEY. No, no; the objective of it—and this is the perfect answer to this question if we can do it—is to accelerate the IOC, maintain the accuracy, maintain reliability, and, overall, save money, and get it sooner. That is the objective.

Mr. **Gaffney**. I see. But you are countenancing the idea of permitting some degradation in the accuracy temporarily with a retrofit program or something to improve it later on?

Mr. **Paisley**. What I am talking about, I haven't seen at all, I am just giving you a thought. I haven't seen anything on the program that indicate they have planned to do that.

Mr. **Gaffney**. That is exactly what this conversation is designed to draw out. So, Admiral Clark, you have no assessment of what the costs of following that sort of two-step process might be?

Admiral **Clark**. That is the sort of information we are trying to develop right now. We ask ourselves the question, if we accelerate the program, how do we accelerate the program? What do we have to do? When do we have to do it? What is it going to cost us as a function of time? What do we project the performance to be at IOC, and if it is not at the objective that we have today, how do we eventually get to that, and what are the costs, that sort of thing? Those things are being worked now, and we are getting toward the end of it, but we haven't completed it yet.

Mr. **Gaffney**. How soon do you anticipate completing your analysis?

Admiral **Clark**. We are scheduled now to brief the Secretary of the Navy within several weeks on the results of the study.

Mr. **Gaffney**. So you are——

Admiral **Clark**. We are pretty much on that schedule right now, and I think we will make the schedule.

Mr. **Gaffney**. Will the Congress be informed of the outcome of those results?

Senator **Warner**. That's the Secretary's office.

Mr. **Paisley**. Let me say something about that so you know my attitude about this sort of thing. We perform a study, and if we are going to recommend that we do something different from the present plan and if we are going to move forward with it, we will bring it over here and show you.

Senator **Warner**. I would assume that, but that is a matter that has to be handled with the Secretary above your level. I don't think there is any desire to be secretive about it.

Each year we try and have the record reflect the implications of any future arms control agreements on your program or the reverse thereof, your program's effect on future arms control.

What about the *Ohio* going to sea? The *Ohio* has been accounted for. It would be the *Michigan*.

Do you intend to go ahead and abide by the SALT I ceilings? Although SALT II never came into effect, there has been some informal adherence to those provisions.

Mr. **Paisley**. Mr. Chairman, I am going to ask someone here if they know the answer to that question, because I sure don't.

Senator **Warner**. It may well be that you will want to think about that very carefully and put that in the record.

Mr. **Paisley**. It probably has to come from OSD because they worry about the SALT thing. We will do that.

Senator **Warner**. I would suggest, unless you want to touch on it a little bit, Captain.

Captain **Coakley**. I recommend we provide an answer for the record.

Senator **Warner**. The question will be stated a little more completely.

[The information follows:]

Although the Administration's START policy is not within my area of responsibility, I can tell you that our policy is under review. Your question should be addressed to the Under Secretary of Defense for Policy for a statement by the responsible individual.

Senator **Warner**. Anything else, counsel?

Mr. **Gaffney**. We might ask one question about the ELF program. We will have the C^3 personnel up next week, but it is always advantageous to have some input from the submariners themselves. Since the President has decided to proceed with the ELF system and that program is going forward, notwithstanding some continuing local concerns about it, it would be helpful for us to have a reaffirmation of the testimony that I think you provided last year, Admiral Kelso, in conjunction with the question the chairman raised a moment ago, trying to anticipate the threat and take actions that fend it off.

Would you discuss that in the context of ELF?

Admiral **Kelso**. Well, you asked me as a submariner. My whole career in the submarine force has been trying to get ELF, so I think I can defend it in believing in it.

You know ELF and why we want it has been misunderstood.

Senator **Warner**. If you want an amusing anecdote, I was on a visit at Los Alamos Labs, and by golly, who was out there at 6:30 in the morning trying to sell ELF but Yogi Kaufmann. I am behind that program 100 percent. I have been trying for 12 years to sell it.

Admiral **Kelso**. The best way to operate a submarine is to give the commanding officer the ability to operate it in such a way that he can take advantage of the world in which he finds himself at the time he finds himself there. By that I mean, if the acoustic conditions are such that he needs to operate deep, that he has the capability to do it. If not, acoustic technologies of the world that people talk about today ever have any promise of any support, they will all tell you to drive the ship deeper, not that I am telling you I know they will have any promise, but there is an awful lot of money being spent in those kinds of areas today.

Mr. **Gaffney**. By the Soviets as well?

Admiral **Kelso**. By the Soviets as well as by us. Most of those technologies tell you that to be able to choose the envelope you want to choose to operate the submarine in. In the context of vulnerability of the ship, ELF to me is an insurance policy, and when you consider the price of one Trident submarine and its missiles, today we are talking about $1.2 billion for a submarine plus $15 million a copy for a Trident II missile, 24 times that, you have got one big investment.

We are talking about spending a quarter of a billion dollars to put a meager ELF system in the ground. If you save one submarine with that investment and you are not able to locate it when you can destroy it, you have made a tremendous investment.

And it primarily is needed to insure the invulnerability in the prelaunch survivability environment. We never have advertised it to be a hard system that won't go away. So I think that is the proper context to look at ELF in, is that we need it to insure that invulnerability. It is one of those technological advantages that you make to counter what somebody else may make in the future, and that is the real issue with ELF, and that is how I see it, why I think we need it.

People talk about it not being a very good communication system because it is a low data rate system. If you were talking about a communication system to send a lot of data and if a lot of data was needed to be sent on it, I would agree with that criticism. It would be nice if it were a much higher data rate. But you can send several, and by several, I mean thousands here, three letter code words that can obviously provide an awful lot of information to a submarine to tell him to come to a different posture or whatever you want him to do in the future. So it has far more flexibility in a useful mode than people sometimes like to consider it to have, even with its low data rate, and it is the only system that I can see in the time I will wear this blue suit, anyway, that is going to provide a capability to let the submarine operate deep and be able to be connected with command authority on a continual basis. The other technologies, I just don't see what I know today, and they all have problems. When you think about blue-green lasers, you have got to build an energy source to put it into space, and then is it not vulnerable in space? If you put the energy source in a ground station and use a satellite to redirect it, then both of those become point targets. The ground station becomes a point target, the satellite again destroyable. They don't provide any big survivable communications system in the future that would do what ELF does.

So I guess a short speech on ELF, that's how I see its value to us.

Senator **WARNER**. Actually, I want to close on this one note. I think you properly answered the question that the United States probably has an advantage in ASW, but that advantage is predicated on what I call peacetime ASW versus wartime ASW. The Soviets have certain constraints geographically in terms of their submarine bases and the like. Right now, because of those shore points, we are able to track perhaps better than we would in wartime when they disperse part of that fleet, and take out our SOSUS and other acoustic devices on day one, I guess, D plus 1 and 2. Then I think some of that equation comes into closer balance.

Would you agree with that?

Admiral **KELSO**. I would agree with you, sir, that as a result of geography we sustain a significant advantage in the ASW world just by the fact that you have to, in order for their forces to come out into the open ocean, and except for the one port, really, Petro on the west coast, they bascially have to go though a set of very narrow choke points to get to sea, and conversely, by us not having to do that, their ability to ever have a system such as SOSUS which as we know it today is very difficult for them to ever come by.

So, yes, I think that provides us a relative advantage in ASW that they will never have, and if you lose that, you certainly lose an advantage, and the ocean is a very big place. That is the importance, I think, of being able to operate our submarines in a much greater ocean area.

The problem is not a problem of technology. It is a problem in using that technology on a continuous basis to be able to look at that total ocean area. It requires a tremendous resource and set of forces.

You can look at SOSUS as a force magnifier in ASW I think is really what happens to it. If you lose it, then you need more forces to be able to do the same thing, capability.

So I agree with you, the relative ASW position between any one ship won't be changed by that but our total forces will be degraded if we lose that system.

Mr. PAISLEY. Let me say one thing along that line, Mr, Chairman, about a blue-green laser, because it comes up, and I know that the question will continue to come up as it associates with this problem. I talked to Admiral Nagler who asked Dr. Cooper, in DARPA, eyeball to eyeball, when he thought this system would be available, if in fact it were to be available, and he said [deleted].

Senator WARNER. [Deleted].

Mr. PAISLEY. [Deleted] the blue-green laser, if in fact we ever bring this technology to bear on this problem. So, I want to make it clear that a lot of people bring that point up, and it is not like something that tech and DARPA are working on. It is not a near term, if a solution at all.

Mr. GAFFNEY. Is he referring to the space-based system or simply a relay system in space with a ground base?

Mr. PAISLEY. He was really talking about the capability to do this function and not specific for any platform. It is a matter of getting the technology in hand to do it.

Senator WARNER. Any comments on the second Trident base on the east coast, the strategic requirements for it?

Admiral KELSO. I don't think there is any question, Senator, in our minds that there is a strategic requirement for the Trident base on the east coast. There has been a good bit of question about the timing of it, which is a different question altogether, but if you look at a force all operated on the west coast of whatever the total number you might look at in your force, if you look at it from a target effectiveness standpoint, you will have to build a bigger force to get the same target effectiveness than if you based them on both coasts, simply because the range charts from the Pacific are considerably different than they are from the Atlantic to the target base, and the target base is [deleted].

So the Atlantic is an ocean which has a great advantage from a targeting standpoint. So I think that basically dictates within the envelope of time between now and the year 2000 that you have got to have two bases when the Poseidon force and the Trident I force goes out in the Atlantic, you have got to replace that force with a Trident force.

So I don't think—it is very easy to depict on graphs the force capability, the need for an Atlantic base, and I don't know of anybody who disputes that.

Mr. GAFFNEY. Are you being constrained from pursuing that in fiscal year 1982?

Admiral KELSO. We are budgeted to build up the base in 1982 to provide an IOC of 1989.

Senator WARNER. Well, the hearing will come to a conclusion with this observation. We have had what I call a very quiet hearing. I think we have put together a good record. But Mr. Paisley, you might expect in the future a more lively session on occasion, not necessarily with this chairman but perhaps others with a different subject. So don't take this first hearing as a model for those that might ensue.

Ask Admiral Kelso.

Mr. **Paisley**. Well, you know, it is like I said at the start, you know, it is one thing to disagree, it is something else to be disagreeable.

Senator **Warner**. Well, the reason we have had a rather quiet hearing is that the subject matter is known to all of us quite well and understood.

You have a good program in the Navy. You have done a good job except for the cost overruns. The Trident submarine, on the whole certainly, is a superior contribution to our defense, and I congratulate you and your colleagues this morning, and indeed, their predecessors.

Mr. **Paisley**. Thank you very much.

Senator **Warner**. And included among them is our highly esteemed friend Admiral Rickover who is now in a well-deserved retirement.

[Additional questions submitted for the hearing record:]

Questions Submitted by Senator John W. Warner

TRIDENT II

Senator **Warner**. Mr. Paisley or Admiral Clark: What is the Navy's current plan for development of the Trident II/D-5 missile system? Is the funding level requested in fiscal year 1983 consistent with an IOC of 1989?

Mr. **Paisley**. The Navy is presently in the second year of a three year advanced development program with DSARC II now scheduled for the end of fiscal year 1983. A six year Full-Scale Engineering Development Program would start in fiscal year 1984 with planned IOC of CY 1989. The fiscal year 1983 funding is consistent with this program.

TRIDENT II ACCELERATION

Senator **Warner**. What specific management steps and other initiatives are being considered as means to achieve an acceleration of the D-5's IOC? Will the implementation of these initiatives require a more high-risk approach to the TRIDENT II development and what are the possible consequences in terms of missile performance and costs that appear involved in such an accelerated program?

Mr. **Paisley**. Examination of acceleration of the D-5 IOC is still under way. Therefore, the information is not yet available.

SSBN SECURITY

Senator **Warner**. Admiral Clark, as you know, one of the considerations affecting SSBN survivability is the fact that a periodic navigational fix must be made in order to update the ship's inertial navigation system, SINS.

Would current technology permit the development of a SINS system that would obviate the need for an external source update throughout the duration of a submarine's deterrent patrol? Would the benefit in reduced exposure such a development would permit—increasing SSBN survivability—justify the costs of such a development program?

Admiral **Clark**. Today's technology would permit development of a navigation system that could significantly increase the interval between external navigation fixes. The full extent to which it could be extended over and above today's capability would need to be determined by an Advanced Development Program and extensive analysis comparing the accuracy of such a navigation system against the requirements of the weapon system.

Incremental improvements in Soviet acoustic and non-acoustic sensors are projected which could improve Soviet anti-submarine warfare (ASW) capabilities. Soviet sensor research could eventually provide some level of effectiveness against our current nuclear submarines. [Deleted.]

Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

SECRETARY LEHMAN'S SUBMARINE CONSTRUCTION REPORT

Senator WARNER. Admiral Webber, as you know, last year in its fiscal year 1982 report the Committee requested of the Secretary of the Navy that he provide a report accompanying the fiscal year 1983 shipbuilding plan which "fully assesses the production situation for both Trident and SSN 688 submarine construction." To date, an interim report has been received, but not the formal report requested. Particularly in view of the draft findings of the GAO on this subject, I believe it is imperative that the Congress have the Secretary's report. When can we expect it?

Admiral WEBBER. The final report should be issued early this month.

COMMENTS ON GAO REPORT

Senator WARNER. Admiral Webber, as you know, the General Accounting Office had circulated a draft report citing continuing construction difficulties at the Electric Boat shipyard, including workforce management problems, quality assurance difficulties, and significant discrepancies between promised delivery dates and costs and those actually achieved. Would you comment in detail for the record on the finding of this report?

Admiral WEBBER. The statement for the record that you permitted me to submit at the beginning of my testimony contains detailed comments on the draft GAO report.

IMPACT OF REPLACING SECOND FISCAL YEAR 1983 SSBN WITH THIRD SSN

Senator WARNER. Admiral Webber, what would be the impact on the construction workforce at Electric Boat, Quonset Point and Groton, of the decision, should the Congress make it, that would result in the authorization of the eleventh Trident submarine being deferred by one year and a third 688-class attack submarine being approved?

Admiral WEBBER. Deferral of the eleventh *Ohio* Class submarine from fiscal year 1983 to fiscal year 1984 will reduce the workforce requirements at Electric Boat. If compensative action in the SSN program is taken and if Electric Boat is awarded the third SSN then the reduction in workforce requirements due to the deferral of the second fiscal year 1983 submarine would be lessened but not eliminated. This is because the number of man days required to build an *Ohio* Class submarine is greater than the number required to build a 688 Class SSN. Also the deferral of the second *Ohio* Class submarine could lead to an adjustment in the application of manning at Electric Boat to stretch out the deliveries of some of the *Ohio* Class submarines to avoid a production break.

IMPACT OF DELETING SECOND FISCAL YEAR 1983 SSBN

Senator WARNER. By contrast, what would the impact be on Electric Boat's workforce, work on vessels now under construction, and costs and schedule of those ships and the fiscal year 1983 vessels resulting from a decision to defer the authorization on the eleventh Trident without taking compensating action in the SSN area?

Admiral WEBBER. Deferral of the eleventh *Ohio* Class submarine, of a third SSN, will reduce workforce requirements at both the Groton and Quonset Point facilities of Electric Boat. This reduction is more severe than in the previous case (a third SSN is authorized). A downward adjustment of workforce and schedule stretchout would likely result. As past events have proven, schedule stretchouts usually result in cost increases.

USS "OHIO"

Senator WARNER. Admiral Kelso and Admiral Webber: Would you provide the Subcommittee with a progress report on the lead ship of the Trident submarine procurement, the USS *Ohio*? Has it been meeting or exceeding specifications set for quietness, speed and depth capabilities, and other survivability-related features designed into the ship?

Admiral **Kelso**. USS *Ohio* has bettered its performance design specifications in such significant areas as speed and quiteness. *Ohio* is faster than predicted at full power, submerged. This ship's characteristics required a maximum speed of [deleted] knots, whereas during full power runs, actual speed achieved was [deleted] knots. *Ohio* is also quieter than designed. *Ohio* employs a [deleted] and thus operates quieter. Design specifications provided for operations with [deleted] *Ohio* also emits less average radiated noise [deleted] than the design specification. Initial acoustical data determined that, [deleted] *Ohio* is on the average [deleted] quieter than design (which was set [deleted].

Ohio has not exceeded its design operating depth characteristic of [deleted] feet, nor is it desired to do this, since design depth is a limit which should not be surpassed. The improvements, however, in speed and quietness are the principal contributors to a significantly increased survivability for the ship and its weapons system.

Admiral **Webber**. The lead ship of the *Ohio* Class USS *Ohio* (SSBN 726) has demonstrated high performance in virtually every area (including speed and quiteness) with respect to design characteristics. The strategic weapons system performed well throughout a very rigorous test program, culminating in successful missile launches by both crews. The defensive weapons system and sonar suite met all design objectives. In terms of submerged ship control, USS *Ohio* is very responsive. Airborne noise levels within the ship are low. In terms of quality of life, the habitability features are a significant improvement over existing submarines. In summary, the ship performs as well or better than predicted by design studies.

USS "OHIO" POST SHAKEDOWN IMPACT ON DEPLOYMENT

Senator **Warner**. Is the Navy having difficulties with Electric Boat in securing agreement on post-shakedown availability that is compatible with the Navy's schedule for the *Ohio* deployment?

Admiral **Webber**. The Navy has experienced difficulties in reaching agreement with Electric Boat on the work to be accomplished during the post-shakedown availability of USS *Ohio*. Earlier this month, bilateral agreement on the work package was reached and the availability will start as scheduled on April 4, 1982.

TRIAD

Senator **Warner**. Admiral Kelso, as you are well aware, there has been interest in some quarters in abandoning the search for a survivable basing system for the ICBM force in favor of an expanded deployment of hard-target kill capable SLBM's at sea. Secretary Lehman, in his recent appearance before this Committee, was very forceful in his response to a question along these lines in underscoring the importance of stressing Soviet defensive countermeasures by maintaining a diversified and highly capable strategic Triad.

Do you share the Secretary's view?

Admiral **Kelso**. Yes, I share the views of Secretary Lehman on this subject.

SSBN SECURITY

Senator **Warner**. To what degree do you believe the elimination of the MX missile in a survivable basing scheme, even if offset by somewhat larger SSBN deployment, could result in a significant reallocation of Soviet resources toward anti-submarine warfare and a substantially increased threat?

Admiral **Kelso**. Significant reallocation of Soviet resources could result in continued growth of tactical Soviet ASW capable forces. [Deleted.]

We should expect an ever-increasing Soviet ASW effort. Historically, the more forces devoted to ASW the more effective the capability and the continued increase in Soviet forces will undoubtedly result in an overall increase in ASW capability. Aggressive deployment of improved countermeasures systems, such as the Trident missile and improved acoustic quieting will be necessary to ensure a continuing security advantage. [Deleted.]

Senator **Warner**. Secretary Paisley, would you provide for the record a statement of the contribution ELF will make toward the SSN forces survivability as it takes on the strategic reserve force role?

Mr. **Paisley**. As with the SSBN force, ELF will contribute to the SSN force's survivability by allowing the submarines to receive communications while operating at increased speed and depth. Survivability is enhanced by limiting the time required to use a surface or near surface antenna, thus reducing the potential for detection.

Senator **Warner**. As you know, our House colleague, Rep. Tom Downey, recently wrote an OP-ED piece for the New York Times which argued against placing a survivable, hard-target kill capable missile like the D-5 at sea. He argues that doing so will jeopardize the stability of the strategic balance and raise the probability of the nuclear hair-trigger being accidentally pulled.

Would you care to elaborate for the record on this issue?

Mr. **Paisley**. Representative Thomas Downey argued in his February 11 OP-ED article that the new Trident II missile would be the "most destabilizing first-strike weapon ever built, far more than the MX." Destabilizing weapons are those which increase the likelihood that a nuclear war would begin and decrease the chances that any nuclear conflict, once started, could be limited.

Far from being the most destabilizing U.S. strategic system, the new Trident II missile is likely to be the most stabilizing system. Indeed, given the political realities of the strategic environment, the Trident II may be the best U.S. hope for the evolution of a far more stable environment than the one which exists today.

Stability is promoted by weapons which reduce the incentives for starting or enlarging a nuclear war. Traditionally, sea-based systems, like the Trident II, have been regarded as stabilizing because they are non-targetable.

The Soviets would not start a nuclear war to attack these weapons because they cannot be attacked. Furthermore, because such survivable weapons threaten unacceptable damage from a U.S. counterattack, they deter a first strike against other U.S. targets.

Stability can be achieved only if both the U.S. and the Soviet Union deploy survivable weapons. At present, most of the Soviet strategic force is based in inherently vulnerable silos. The U.S. can motivate the Soviet Union to deploy more survivable (and thus more expensive) weapons only if the Soviets perceive their present emphasis on silo-based weapons as unsatisfactory.

The new Trident II is likely to be the best way for the U.S. to encourage the Soviets to adopt more survivable basing. Threatening future Soviet systems will encourage the Soviets to reduce the vulnerability of their strategic missiles. Because the Trident II will be invulnerable, it does not invite a pre-emptive first strike, and because it will be introduced gradually, it provides the Soviets with time to change their strategic force.

The Trident II is desired by those concerned that the U.S. will appear weak if it fails to develop the prompt counterforce capability already possessed by the Soviets. But the Trident II should be desired also by those concerned with improving strategic stability, for, better than any other proposed system, it encourages the Soviets to make the strategic changes necessary to minimize the risks of nuclear war.

JUSTIFICATION FOR SECOND FISCAL YEAR 1983 SSBN

Senator **Warner**. Would you describe for the Committee the reasons that justify the Navy's request for two *Ohio* class submarines in fiscal year 1983?

Admiral **Webber**. Significant benefits would accrue to the Government by authorizing the second *Ohio* class submarine (eleventh submarine) in fiscal year 1983. These benefits include:

Permit the Navy to exercise a firm priced option for two submarines that is part of the award completed this past January for the fiscal year 1981 *Ohio* class submarine. The contract delivery dates for these two submarines, if the option is exercised, are August 1988 and April 1989 respectively.

Avoid the possibility that Electric Boat would elect to undergo a production break, thereby adding greater confidence to achieving contract delivery dates.

Avoid a significant increase in program costs due to inflation and breaks in production and procurement.

Deliver to the Navy the eleventh submarine earlier that it would be if that submarine were deferred until fiscal year 1984. Also, the twelfth submarine could be delivered at least eight months earlier if authorized in fiscal year 1984 rather than fiscal year 1985.

IMPACT OF DEFERRING SECOND FISCAL YEAR 1983 SSBN

Senator **Warner**. What would the impact of a deferral of one of those ships into fiscal year 1984 be on shipyard workforce stability, overhead charges and possible cost-growth on other ships under construction at Electric Boat, and, most importantly, deployed SLBM tubes at sea?

Admiral **Webber**. Deferral of the eleventh *Ohio* class submarine from fiscal year 1983 to fiscal year 1984 will reduce the workforce requirements at Electric Boat. Adjustments in the application of manning could cause downward adjustments of the workforce, stretchout of deliveries of submarines now under contract and corresponding increased costs of labor and overhead. Since there was no Trident submarine authorized in fiscal year 1982, the stability of the production line would be disrupted by a break in production. These effects would be in addition to the increased cost of the eleventh Trident submarine itself should it be deferred from fiscal year 1983 to fiscal year 1984.

I will defer to Admiral Kelso to answer the deployment of SLBM tubes at sea.

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

TRIDENT II ACCELERATION

Senator NUNN. Secretary Paisley, what is your expectation in terms of developing the D-5 missile "in the shortest time for the lowest cost," as you indicate in your statement?

Secretary PAISLEY. Acceleration of the Trident-II (D-5) missile IOC is presently under active study by the Navy, both by its technical community and by a Navy Research Advisory Committee (NRAC). The technical and economic feasibility of acceleration of up to two years is being examined. Specific analyses of the trade-offs involved and quantitative estimates of costs of an accelerated program relative to the currently planned program will not be available until the initial studies are completed later this month.

Senator NUNN. Secretary Paisley, how could the D-5 program be accelerated and what additional funding would be required?

Secretary PAISLEY. Presently we are attempting to identify to what extent we might accelerate the deployment of the Trident II weapon system. Specific issues being addressed are the impact on the funding profile as well as any compromises anticipated to the performance of the system. This assessment will be completed and will be briefed to the Secretary of the Navy this month.

Senator NUNN. Secretary Paisley, how confident are you in your ability to achieve "Initial Operational Capability one or two years earlier," as you indicated in your statement?

Secretary PAISLEY. Examination of acceleration of the D-5 IOC is still under way. Therefore, I can not yet provide a definitive answer to this question.

Senator NUNN. Secretary Paisley, did you participate in the Navy study on the ECX aircraft and have any operational tests been performed on any air frames other than the C-130 to determine performance with the trailing antennae system?

Secretary PAISLEY. Orbit maneuvers have been flown by a Naval Air Test Center pilot on a large jet aircraft. Our research into candidate aircraft for performing the TACAMO mission of the future the 1977 Naval Air Development Center Report No: 77261-30, found that centerline drag of about 800 pounds, produced by the TACAMO antennas, would not seriously affect any large aircraft's ability to perform the TACAMO orbit maneuver. The drag can be compensated for with engine power, and is not an appreciable factor, for any larger aircraft.

Senator NUNN. Secretary Paisley, have any operational tests with the exact antenna system utilized been performed in the flight patterns needed using the Boeing 707 airframe? What were the results, especially as they relate to stall potential when in the typical 40 degree bank?

Secretary PAISLEY. No jet aircraft has been configured with the TACAMO dual trailing wire antennae and tested. Computer modeling by the Naval Air Development Center (NADC) of aircraft power, drag and airframe performance characteristics indicates these aircraft could perform the TACAMO orbit safely: B-747, B-747SP, B-707-320, DC-10 (KC-10), and L-1011. NADC analysis reveals that these aircraft can achieve the required antenna verticality with stall margins in orbits equal to or greater than stall margins experienced in EC-130's today.

SECOND FISCAL YEAR 1983 TRIDENT

Senator NUNN. Admiral Kelso, what is the impact on the national 20-boat Trident force if one of the two requested Tridents is not authorized? What impact would a decision like that have on the number of platforms available for an accelerated Trident II IOC of one to two years?

Admiral KELSO. The immediate impact is that deliveries of the eleventh and subsequent ships would be delayed by at least four months, thereby, further delaying the deployment of these highly capable deterrent forces. Simplistically the effect would be that there would be one less ship throughout the present planned program. Similarly, there would be one less ship available for deployment of Trident-II (D-5) missiles, whether accelerated or not.

TRIDENT-II DEVELOPMENT

Senator NUNN. Admiral Kelso, how will the D-5 testing program be handled? How and where will the missile assembly and training facilities be located?

Admiral KELSO. The D-5 testing program will be similar to the highly successful program utilized for the development and testing of the Trident-I (C-4) missile. Trident-II missile test facilities are being constructed at China Lake, California, and at Cape Canaveral, Florida. The missile assembly and training facilities will be located initially at Kings Bay, Georgia, and later when required (mid-nineties) at Bangor, Washington.

TRIDENT-II EQUIVALENT FORCE

Senator NUNN. Admiral Kelso, I asked some questions at the October 30, 1981, hearing on the Trident with the D-5 versus the MX system when you were present. Admiral Williams indicated the Navy could prepare a study on this subject. What are the results of this study?

Admiral KELSO. Your question at the 30 October hearing concerned the number of Trident submarines that would be needed to replace the MX missile if it were to be terminated and the cost to produce such a force.

It must be noted that the Strategic Modernization Program is an interlocking set of initiatives designed to reverse the adverse trends in the strategic balance. In this regard, we cannot regard Trident as an alternative to MX. Both systems are required if we are to regain the necessary stability and balance between the US and USSR strategic forces.

Depending upon the type warhead the MX will have [deleted] it will require [deleted] Trident SSBNs equipped with the D-5 missile in the inventory to provide a target damage potential equivalent to that of 100 surviving MX missiles. This assumes that the Trident force is on a day-to-day alert basis with [deleted] the force at sea and survivable. It also uses the JCS assumptions which assess a pre-launch survivability of unity to SSBNs at sea.

If it is assumed that the R. & D. for the D-5 missile plus procurement of test missiles will be done for other reasons, the incremental costs in constant fiscal year 1982 dollars to procure [deleted] Trident II submarines, their ship fill of missiles, plus military construction is estimated to be about [deleted] for [deleted] submarines and their missiles about [deleted]. If the entire missile R. & D. plus test missile costs are included, total costs for [deleted] Trident II submarines would be about [deleted] for [deleted] about [deleted].

A more reasonable approach would be to proportion the R. & D. and test missile procurement costs between the [deleted] Tridents to "replace the MX capability" and the Trident II force required for other reasons. Assuming a 20 ship Trident II force, the costs for [deleted] Tridents would be about [deleted] for [deleted] about [deleted].

Senator NUNN. Admiral Kelso, how many Trident boats with D-5 missiles would it take to provide the hard-target coverage of 100 MX missiles? Please provide this analysis using the MK-12A and ABRV on the MX and using a survivability factor on the MX of 25 percent, 50 percent, 75 percent, and 100 percent.

Admiral KELSO. It must be noted that the Strategic Modernization Program is an interlocking set of initiatives designed to reverse the adverse trends in the strategic balance. In this regard, we cannot regard Trident as an alternative to MX. Both systems are required if we are to regain the necessary stability and balance between the US and USSR strategic forces.

In the comparison, it is assumed that the MX will carry [deleted] RVs, will have a weapon system reliability of [deleted] and an accuracy of [deleted]. The yield of a Mk-12A RV is [deleted] if [deleted] the yield will be either [deleted] depending upon whether the [deleted] variant is chosen.

For the D-5, it is assumed that it will carry [deleted] RVs in the [deleted] range, will have a weapons system reliability of [deleted] and will achieve the design goal accuracy of [deleted].

The comparison shows the number of D-5 tubes and submarines required in the inventory to provide a destructive potential against super hard targets equivalent to that of 100 MX for the several MX loadings and survivability factors. The Trident II is assumed to be in the day-to-day alert situation in which [deleted] the inventory tubes are at sea, survivable and available for targeting. It also uses the JCS assumptions which assess a prelaunch survivability of unity to SSBNs at sea. [Deleted.]

Senator NUNN. Admiral Kelso, what are the implications for force size of requiring the Trident fleet with the appropriate number of Trident I and Trident II missiles to replace the MX system and also accomplish target coverages of those areas unique to the submarine force?

Admiral KELSO. Again, I want to reiterate this point regarding tradeoffs between the MX and the Trident forces: It must be noted that the Strategic Modernization Program is an interlocking set of initiatives designed to reverse the adverse trends in the strategic balance. In this regard, we cannot regard Trident as an alternative to MX. Both systems are required if we are to regain the necessary stability and balance between the US and USSR strategic forces.

There are no target sets "unique" to the submarine force. Today, the submarine force is [deleted] and, because of the high survivability and endurance, provides the major portion of those weapons [deleted] Trident submarines equipped with the D-5 missile will equal the targeting effectiveness against [deleted] today's 31 ship Poseidon force. A similar capability could be provided by a force of about [deleted] Tridents if equipped with the C-4 missile.

As noted in the previous question, about [deleted] Trident II SSBNs would provide a force equal in damage potential to 100 MX assuming they have 100 percent survivability and are loaded with the [deleted]. A force of about [deleted] Trident IIs thus could provide a capability equal to that of today's Poseidon force and 100 surviving MX missiles plus provide about [deleted] missiles for the [deleted].

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

SSBN SECURITY

Senator LEVIN. On March 19, 1979 Dr. Perry, then Under Secretary of Defense told this subcommittee that he did not project that the Soviets would be able to develop a system to localize our SSBNs during the entire decade of the 1980's. He characterized the Soviet ASW research program as "not very successful" despite its relatively large size. On March 21, 1979 Dr. David E. Mann, then Assistant Secretary of the Navy for Research, Engineering, and Systems agreed with Dr. Perry's assessment of Soviet ASW development and even went further by stating:

"Yes, I agree with it provided there is no implication that in the 1980's that they will develop such a capability." When I asked Dr. Mann: "No earlier than the 1980's?" he responded "No earlier than that; yes." Admiral Kelso, have there been any developments in the Soviet threat to our missile submarines to change this assessment?

Each year I ask the Navy's top Admirals, the CNO and your successors in the strategic Submarine Office, Admiral Clark and DCNO for Submarine Warfare, the following, "Admiral, since your appearance before the committee last year, has there been any change in the Soviet threat to our strategic ballistic missile submarines in terms of greatly improved Soviet anti-submarine warfare capabilities?" The answer has always been "No", I then have asked:

"Does the Navy still consider these missile submarines to be invulnerable against the Soviet threat at the present time and does the Navy still expect that these submarines shall still remain invulnerable against the Soviet ASW threat until at least the end of this decade?"

The answer has always been "Yes". Mr. Paisley, Admiral Clark, Admiral Kelso, are these answers still the same as far as you each are concerned?

Admiral KELSO. [Deleted.]

Incremental improvements in Soviet acoustic and non-acoustic sensors are projected which could improve Soviet anti-submarine warfare (ASW) capabilities. Soviet sensor research could eventually provide some level of effectiveness against our current nuclear submarines. Our plans to counter this possible increased effectiveness include the deployment of the Trident submarine and the Trident missile. The longer range Trident missile will permit operation of our submarines in more than ten times the present patrol area size thus increasing Soviet search areas significantly. The Trident submarine incorporates significant quieting improvements [deleted] to reduce detection and complicate search by advanced sensors. The larger Trident submarine also permits installation [deleted] as potential threats become identified. Advances incorporated into the Trident weapons system will provide increased flexibility [deleted].

Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator LEVIN. Last February in response to my question, the CNO responded: There has been no change in our assessment of the Soviet threat to our strategic missile submarines. We continue to believe that Soviet anti-submarine warfare (ASW) forces are not now an effective counter to U.S. SSBNs. We believe that Soviet ASW capabilities will improve, but that introduction of the Trident missile and Trident submarine with the corresponding expanded operating areas and improved acoustic quieting will provide continued survivability. We believe the Soviets have little prospect of developing new systems capable of effectively detecting and tracking U.S. submarines in broad ocean areas in the foreseeable future. We conclude that virtually all U.S. SSBNs on patrol would be able to launch their missiles through the next decade.

Mr. Paisley, Admiral Clark, Admiral Kelso, would you agree with this response, one year later?

Admiral KELSO. We continue to concur [deleted] that Soviet forces are not now an effective counter to U.S. SSBNs and that at least through the next decade virtually all SSBNs on patrol would be able to launch their missiles. These estimates are founded on the continuing ability of our SSBN forces to maintain their security advantage [deleted].

Senator LEVIN. Last year, Admiral Carter head of the Navy's Strategic and Theatre Nuclear Warfare Division testified that:

"Anti-submarine warfare is a war of attrition. Given a capability it takes time, weeks or months, to detect and localize any significant portion of a submarine force." I then asked him:

"Would you agree that despite the expenditure of billions of dollars or rubles that the Russians have made in past decades to improve their ASW capabilities they have failed to develop such a detection and localization capability to successfully attack and destroy our strategic missile submarines?" He responded: "Yes, sir. I would agree that is true." Mr. Paisley, Admiral Clark, Admiral Kelso, is this still true?

Admiral KELSO. Tactical Soviet ASW-capable forces will continue to grow in capability. To date, [deleted].

As we look forward, we should expect an increasing Soviet ASW effort. Historically, the more forces devoted to ASW, the more effective the capability and the continued increase in Soviet forces will undoubtedly result in an overall increase in ASW capability. Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator LEVIN. Your statements about the lack of change as far as improvements in the Soviet ASW threat to our missile submarines in the last year, as well as your predictions that our submarines will remain invulnerable to Soviet threats well into the next decade, take into account Soviet efforts in both acoustic and non-acoustic ASW, do they not?

Admiral KELSO. Yes [deleted].

Incremental improvements in Soviet acoustic and non-acoustic sensors are projected which could improve Soviet anti-submarine warfare (ASW) capabilities. Soviet sensor research could eventually provide some level of effectiveness against our current nuclear submarines. Our plans to counter this possible increased effectiveness include the deployment of the Trident submarine and the Trident missile. The longer range Trident missile will permit operation of our submarines in more than ten times the present patrol area size thus increasing Soviet search areas significantly. The Trident submarine incorporates significant quieting improvements [deleted] to reduce detection and complicate search by advanced sensors. The larger Trident submarine also permits installation [deleted] as potential threats identified. Advances incorporated into the Trident weapons system will provide increased flexibility [deleted].

Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator LEVIN. Two years ago, I asked Admiral Griffiths, then DCNO, Submarine Warfare, the following question: "What is your assessment of SSBN vulnerability in the late 1980's and 1990's? Is there any reason to be cautious in deploying the Trident II missile because of growing vulnerability of the SSBN force?"

He answered: "We continue to concur with the assessment which concludes that Soviet forces are not now an effective counter to U.S. SSBN's and that at least through the next decade virtually all SSBN's on patrol would be able to launch their missiles. Incremental improvements in Soviet acoustic and non-acoustic sensors are projected which could improve Soviet anti-submarine warfare, ASW, capabilities. The projected limitations of sensors and forces, the countermeasures and counter tactics available to the U.S., the general complexity of the problem and the deployment of longer range missiles with corresponding larger operating areas leads us to believe"—deleted.

Do you agree his answer still is true?

Admiral KELSO. We continue to agree [deleted] that Soviet forces are not now an effective counter to U.S. SSBNs and that at least through the next decade virtually all U.S. SSBNs on patrol would be able to launch their missiles. [Deleted].

Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator LEVIN. A major advantage of the Trident I missile as far as SSBN survivability is concerend is that its longer range, compared with the Poseidon missiles, gives our SSBN's more ocean in which they can hide.

Once we deploy the Trident II, which has even longer range than the Trident I missile, this will make the Soviets ASW tasks even more difficult because of the even larger ocean areas in which our missile submarines could hide, would you not agree?

Admiral KELSO. Introduction of the Trident missile will permit operation of our submarines in more than ten times the present patrol area size thus increasing Soviet search areas significantly. For the future we must continue to pursue our SSBN Security Program and improvements in survivability for our submarines and weapons systems to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator LEVIN. Admiral Griffiths in 1980 testified that it is extremely difficult for even the U.S. Navy, which has a far better capability (that I think everybody acknowledges), in ASW than does the Soviet Union to detect our strategic missile submarines, even when they deploy existing communications such as the towed buoy antenna and the floating wire antenna. Admiral Griffiths stated that even with the floating wire antenna the success rate of U.S ASW forces is extremely small.

I asked you, Admiral Kelso, and Admiral Carter, last year, "whether you would agree that these statements remain true today despite the passage of another year?" Both answers were: Admiral Carter: "Yes; I would agree with that"; Admiral Kelso: "Yes, sir; I would agreee with that."

One year later, do these statements and your agreement with them remain the same?

Admiral KELSO. Detection of floating wire antennas (FWA) or communications buoys does not represent a serious threat to the U.S. SSBN force today [deleted].

We want to stay ahead. The SSBN is too important in the deterrent equation to take for granted. The basic problem facing an opponent is how to conduct a meaningful search of the large operating areas available to the U.S. SSBN force. Again, this is looking at the system, the entire system, as a deterrent. [Deleted.] SSBNs, as an overall deterrent, are very survivable. This assessment does not however [deleted].

The important factor to consider is that with present day communications, submarines [deleted]. Historically, even as far back as World War II, our experience has shown that a submarine operating [deleted].

Senator LEVIN. Please provide for the record the number of U.S./allied and Soviet detections of U.S. SSBN's during the past five years, by year, compared with the number of annual patrol days. Described whether the detections were accidential and at random, or could be attributed to any U.S. SSBN deficiency or Soviet ASW capability.

Admiral KELSO. There have been less than [deleted] probable detections per year by both U.S. and allied forces. This compares with over 6,000 SSBN patrol days that U.S. SSBNs conducted per year. [Deleted.]

Senator LEVIN. Admiral, we are considerably better at antisubmarine warfare than the Soviets, are we not? That is, we have much more success finding their submarines and our own submarines than they do, is that not so?

Admiral KELSO. It is true that we have more success finding Soviet submarines than they do in finding ours. [deleted] and when faced with projected quantitative and qualitative improvements by the Soviets, it is not prudent to specify our advantage in terms of a specific time interval. Only aggressive deployment of improved systems, such as the TRIDENT missile and improved acoustic quieting can ensure a continuing security advantage. [Deleted.]

Senator **Levin**. Admiral, even though we are much better at ASW than the Soviets, we find it extremely difficult to detect our own strategic ballistic missile submarines under normal patrol circumstances, and especially when our SSBN's try to evade our own ASW forces, is that not so?

Admiral **Kelso**. It is true that our ASW forces have difficulty in detecting our SSBN's and it is true that we have more success finding Soviet submarines than they do in finding ours. [Deleted.]

However, [deleted] when faced with projected quantitative and qualitative improvements by the Soviets, it is not prudent to specify our advantage in terms of a specific time interval. Only aggressive deployment of improved systems, such as the Trident missile and improved acoustic quieting can ensure a continuing security advantage. [Deleted.]

We should expect an ever-increasing Soviet ASW effort. Historically, the more forces devoted to ASE, the more effective the capability and the continued increase in Soviet forces will undoubtedly result in an overall increase in ASW capability.

Senator **Levin**. Again, there actually would have been very few detections by our own forces of our own SSBN's under normal patrol conditions, is that not so?

Admiral **Kelso**. There have been less than [deleted] probable detections of U.S. SSBN's per year by both U.S. and allied forces. This compares with the over 6,000 SSBN patrol days that U.S. SSBN's conduct each year. [Deleted.]

Tactical Soviet ASW-capable forces will continue to grow in capability. To date [deleted]. As we look forward, we should expect an ever-increasing Soviet ASW effort. Historically, the more forces devoted to ASW, the more effective the capability and the continued increase in Soviet forces will undoubtedly result in an overall increase in ASW capability.

Senator **Levin**. Two years ago, I asked: "Even though we are much better at ASW than the Soviets, is it not true that we find it extremely difficult to detect our own strategic ballistic missile submarines under normal patrol circumstances?" The answer, Admiral Griffiths: "Yes, very difficult."

This remains the case, does it not?

Admiral **Kelso**. It is true that we have more success finding Soviet submarines than they do in finding ours. [Deleted.]

However [deleted], and when faced with projected quantitative and qualitative improvements by the Soviets, it is not prudent to specify our advantage in terms of a specific time interval. Only aggressive deployment of improved systems, such as the TRIDENT missile and improved acoustic quieting can ensure a continuing security advantage. [Deleted.]

Senator **Levin**. Is it accurate to say that U.S. strategic submarines have an outstanding ability to lose Soviet trailing submarines? Why?

Admiral **Kelso**. The success of U.S. submarines against Soviet submarines is due in large part to [deleted].

Senator **Levin**. Are not U.S. SSBN/SSN sonar systems more capable than Soviet sonars? Are not Soviet submarine noise levels, acoustic signatures, higher than those of U.S. SSBN's? Do not these two factors provide U.S. submarines a significant relative advantage over Soviet submarines? Please provide relative data to compare in these areas.

Admiral **Kelso**. Current U.S. submarine passive sonars are considered to be [deleted.]

Senator **Levin**. Is it not true that DOD/Navy has many programs underway to enhance SSBN survivability, such as development methods of reducing SSBN detection, including conducting a noise reduction program to lower SSBN-generated noise reduction goals? Is it not true that SSBN-generated noise of the existing fleet has been and is being reduced?

Admiral **Kelso**. The Navy has numerous priority programs to continue to maintain U.S. submarine survivability. These include: [deleted] and longer range missiles to permit operation in larger ocean areas thus diluting any submarine detection effort.

Senator **Levin**. Two years ago I asked Dr. Perry about Soviet capabilities to simultaneously attack all our SSBN on patrol. I stated that for such a threat to mean anything as far as degrading the nuclear deterrent of our SSBN's, the Soviets would have to be able to strike them all at once. Dr. Perry responded:

"Nevertheless, basically what you say is correct, it would have to be a simultaneous attack on the submarines for the Soviets to have any confidence in the success of their attack.

"I do not want to dramatize this point and I suggest that they either have this capability or that it would be easy for them to achieve it. It is an enormously difficult technical problem even to detect one submarine at sea, much less detect the whole fleet, discriminate the submarines from all the other things in the area and have high confidence in an attack. This is an extraordinarily difficult task."

Would you agree, Admiral Kelso?

Admiral KELSO. Dr. Perry's hypothetical example assumed [deleted] U.S. SSBNs were at sea, that all [deleted] SSBNs could be simultaneously located [deleted] and that Soviet ICBMs with [deleted] warheads would be used in a barrage attack to the SSBN force. Based on these assumptions, Dr. Perry calculated that a minimum of [deleted] warheads would be required to destroy the [deleted] SSBNs at sea. This hypothesis assumes employment of the Soviet ICBM force against U.S. SSBNs [deleted]. Note that the assumption is based on simultaneous location of all U.S. SSBNs at sea [deleted]. This hypothesis also rapidly degrades such that if location [deleted] is assumed, a minimum of [deleted] warheads becomes required which, as Dr. Perry testified, would make such an attack totally infeasible.

Senator LEVIN. I continued: "How much warning would we have if they proceeded on that path? He said: "It depends very much on how they would proceed, but in all of the ways I can think of now that you would proceed on that problem it would be a very visible program."

Admirals, would you agree it would be very "visible program," thus giving us years of warning time? We would have this warning as to the extent to which they might be achieving that capability, would we not?

Admiral KELSO. [deleted].

As with any Soviet classified research it is not feasible to totally understand the details and status of this research. Faced with projected potential quantitative and qualitative submarine detection by the Soviets, it is not prudent to specify our advantage in terms of a specified time interval. Only aggressive deployment of improved systems, such as the Trident missile and improved acoustic quieting can ensure a continuing security advantage. [Deleted.]

Senator LEVIN.AT1 DR. PERRY TWO YEARS AGO IN PART DESCRIBED THE INCREASED SOVIET ASW PROBLEM CAUSED BY OUR SSBN'S NOW DEPLOYING WITH LONGER-RANGE TRIDENT MISSILES AS:

"Moreover, that ocean area that they have to search, instead of being close to the Soviet Union and therefore accessible, for example, the airplane patrols and antisubmarine surface ships, is now located in areas of the Atlantic and Pacific such that it would be extraordinarily difficult for them to deploy their resources to these areas. This is therefore an enormous improvement. I would say it is easily an order of magnitude, that is a factor of ten, increase in difficulty for whatever antisubmarine warfare program the Soviets have."

You would agree with this as still being true, despite passage of two years?

This difficulty is even worse when the even longer range Trident II comes on line, is it not?

Admiral KELSO. There has been no change in our assessment of the Soviet threat to our SSBNs. [Deleted]. This assessment is based on the continuing aggressive development and deployment of improved systems, such as the Trident missile and acoustic quieting, to maintain this security advantage. It becomes increasingly clear that effective countermeasures for potential future ASW sensors must include the capability to [deleted].

Senator LEVIN. What are the documented results of U.S. anti-submarine wartime activities against our own assets? If we, with our much better systems, have problems detecting our own SSBN's as was stated before this Subcommittee, why do we think the Soviets are or would be successful?

Admiral KELSO. There have been less than [deleted] probable detection of U.S. SSBNs per year by both the U.S. and attack forces. This compares with the over 6,000 SSBN patrol days that U.S. SSBNs conduct each year. [Deleted]. Soviet sensor research could eventually provide some level of effectiveness against our current nuclear submarines. Our plans to counter this possible increased effectiveness include the deployment of the Trident submarine and the Trident missile. The longer range Trident missile will permit operation of our submarines in more than [deleted] the present patrol area size thus increasing Soviet search areas significantly. The Triadent submarine incorporates significant quieting improvements and [deleted] to reduce detection and complicate search by advanced sensors. The larger Trident submarine also permits installation of advanced countermeasures equipment as potential threats become identified. Advances incorporated into the Trident weapons system will provide [deleted]. Our SSBN Security Program and the improvements in survivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

Senator **Levin**. What programs are anticipated, underway or conceived for reducing other SSBN signatures and improving sonars to increase the probability our SSBN's will detect the enemy before being detected? Please elaborate and be specific here.

Admiral **Kelso**. The Navy has numerous priority programs to continue to maintain U.S. submarine survivability. These include: [Deleted] and longer range missiles to permit operation in larger ocean areas thus diluting any submarine detection effort.

Senator **Levin**. I asked the preceding question to DoD's Dr. Gerry Dineen, Assistant Secretary of Defense for Command, Control and Communications, three years ago. He responded: "Soviet ASW systems today as compared to U.S. ASW systems are characterized by short range localization track and attack capabilities." [Deleted] "may be difficult since the typical Soviet nuclear submarine has a much greater acoustic radiated noise signature than U.S. SSBN's. Thus, an alert SSBN is likely to detect an approaching Soviet submarine in ample time to take evasive action." Would you agree this still is true?

Admiral **Kelso**. Current U.S. submarine passive sonars are [deleted]. Continuing priority U.S. efforts in both quieting and sonar development will be necessary to maintain a U.S. acoustic advantage.

SECOND FISCAL YEAR 1983 "OHIO" CLASS SSBN

Senator **Levin**. Mr. Secretary, what is your estimate of the length of the production break if second Trident is not funded in 1983? What is your estimate of the added cost?

Secretary **Paisley**. It is difficult to assess the length of the production break that the contractor may take if the second *Ohio* Class SSBN is not funded in fiscal year 1983. That is dependent on the contractor's production and manning policies; it is estimated, however, that a program stretchout would occur. If the second ship in fiscal year 1983 is cut from the budget, SSBN 736 (11th hull) would slip to become the fiscal year 1984 ship and would deliver a minimum of 4 months later than the current contract date of April 1989. SSBN 737 would be delivered at least eight months later than presently scheduled.

As for cost, the Navy presently has a priced option for the SSBN 736. If the ship were not authorized and procured as a single ship in fiscal year 1984 with only one ship being authorized in fiscal year 1983, the end cost of SSBN 736 would be $1,692.8 million—an increase of $341 million in the 11th ship. This figure includes $225 million for inflation, escalation, and program stretchout.

TRIDENT II ACCELERATION

Senator **Levin**. Mr. Secretary, if the D-5 IOC is accelerated will you require additional funding in 1983, and if so how much?

Secretary **Paisley**. Presently we are attempting to identify to what extent we might accelerate the deployment of the TRIDENT II weapon system. Specific issues being addressed are the impact on the funding profile as well as any compromises anticipated to the performance of the system. This assessment will be completed and will be briefed to the Secretary of the Navy this month.

Senator **Warner**. The subcommittee is recessed.

[Whereupon, at 10:18 a.m., the subcommittee recessed subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

MONDAY, MARCH 8, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

AIR-BREATHING DETERRENT

The subcommittee met in open session, at 9:32 a.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Goldwater, and Levin.

Staff present: Frank J. Gaffney, George K. Johnson, Jr., David S. Lyles, Patrick L. Renehan, professional staff members; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Buzz Hefti, assistant to Senator Warner; Robert Nichols, assistant to Senator Jackson; Frank Krebs, assistant to Senator Cannon; Greg Pallas, assistant to Senator Exon; Peter Lennon, assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. Good morning, Senator Goldwater, Secretary Keel, and General Burke.

The subject of the subcommittee today is the air-breathing component of our strategic nuclear deterrent. As such, our witnesses will be asked to provide testimony on the range of programs comprising and supporting this leg of the nuclear Triad.

We have Dr. Keel, well known to this committee, Assistant Secretary of the Air Force for Research and Development, and we have Lt. Gen. Kelly Burke. We will begin with Dr. Keel.

STATEMENT OF ALTON G. KEEL, JR., ASSISTANT SECRETARY OF THE AIR FORCE, RESEARCH, DEVELOPMENT AND LOGISTICS, ACCOMPANIED BY LT. GEN. KELLY H. BURKE, USAF, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION; AND COL. JIM EVATT, USAF, SPECIAL ASSISTANT FOR B-1

Dr. KEEL. Thank you, Mr. Chairman. With your permission I will make a few very brief remarks and then we will move with General Burke giving you summaries of our air-breathing programs.

As you recall, last Tuesday we commented that in judging our defense program and our requests that it must be done in the context of what the threat is doing. As you recall, we indicated over the last 10 years the Soviet's effort in strategic procurement alone has exceeded ours by aproximately $130 billion.

As a consequence in bombers, for example, they have produced about 150 Backfires in the last 5 years and it is projected they have the opportunity to produce at a rate of about 30 a year, whereas, as you are eminently familiar, we have produced no new bombers.

In addition, they have made a massive investment in air defense which, of course, is designed to counter our air-breathing leg. So, as a consequence, one of the key elements of the present strategic modernization program is modernizing the air-breathing leg which we are going to discuss this morning, which is absolutely imperative to do and which is one of our highest priorities.

It consists, as you know, of continuing modernization of the B-52G's and H's while retiring the B-52D's. In addition, it consists of procuring 100 B-1B aircraft with an IOC of 1986, as well as pursuit of an advanced technology bomber with a possible IOC in the 1990's; and upgrading our aerial tanker force which is a critical part of our air-breathing leg, of course.

Our approach, in our mind, to our bomber force modernization is well conceived in that it does consist of modernizing our existing aircraft as well as committing to procurement of the B-1B and pursuing the ATB.

Procurement of the B-1B is essential to give us a near-term capability to make sure we preserve the ability to penetrate well into the 1990's.

The ATB, meanwhile gives us the opportunity to pursue advanced technology to preserve our ability to penetrate well into the 21st century, as well as to complicate the task of the Soviets in terms of countering our air-breathing leg and potentially, of course, requiring them to divert resources into a massive defense effort to counter the ATB-type aircraft.

I would like to point out that in executing the B-1B program there is an absolute firm and unequivocal commitment on the part of the administration, the Department of Defense, and the Air Force to control the cost. In fact, in my view it is probably unprecedented. As you know, the President himself certified to this committee as well as other committees of Congress that the B-1B program can in fact be executed for the $20.5 billion in fiscal year 1981 dollars.

In addition, perhaps for the first time in history, the Secretary of Defense is in effect the configuration control authority for the aircraft. Before any major changes can be made which would affect the cost or the acquisition strategy of the program the Deputy Secretary of Defense must approve those changes.

In addition, within OSD there is an executive committee on strategic programs.

Senator WARNER. Dr. Keel, there must be a threshold on that. I mean, if you want to change a couple of screw nuts in the wing or something to that effect. It is a good system, but is there not some sort of a threshold?

Dr. **Keel**. Yes, sir, it has to be judged a major change first and has to affect the acquisition strategy and affect the cost.

General **Burke**. Included in the $20.5 billion is a sum for what we call engineering change orders. The program manager is free to make changes that he can fund within this authorization. It would require review and approval if he wished additional money which would exceed the $20.5 billion estimate.

Senator **Warner**. Are there any other programs in the Pentagon that have that system?

Dr. **Keel**. Not with the Deputy Secretary of Defense being the ultimate change authority.

Senator **Goldwater**. How many major changes do you plan on the B-1?

Dr. **Keel**. Well, actually we do not plan any major changes. We have in fact, Senator—as we will get into a little later because in fact it is not a brandnew development—our ECO allowance is lower than for a new program. We have been criticized in some quarters for that, but we think it is exactly appropriate. We have roughly about a 6-percent allowance in the budget for change proposals whereas for a new program it is something on the order of 10 percent. So, we do not anticipate major changes in the program.

In addition, as I was mentioning, there is an Executive Committee on Strategic Programs which is chaired by the Under Secretary of Defense for Research and Engineering, Dr. DeLauer, I and the Vice Chief of Staff of the Air Force are members of this committee which has oversight over all strategic programs and of course as such over the B-1B program.

Within the Air Force, no significant changes can be made outside of the scope of the program without the Chief of Staff's approval and of course the Secretary of the Air Force's approval.

In addition, within the Air Force General Burke chairs the B-1B steering group which has oversight and review of program changes for the B-1B program.

During the contract negotiations we have had biweekly reports to the Deputy Secretary of Defense on the status of negotiations. Since the conclusion of the major contract negotiations, we have continued to have biweekly status briefings to the Secretary of Defense and the Deputy Secretary of Defense.

In addition, we will have quarterly reports sent to the Under Secretary of Defense for Research and Engineering, as well as the Deputy Secretary of Defense on the status of the program.

So, in conclusion, clearly this program has unprecedented management attention and in fact commitment on the part of the administration to control cost. That is an absolute and firm commitment.

Finally, I would like to comment if I may on our decision to require the B-52D's from our bomber force. As you know, we are going to retire five squadrons over approximately the next 4 to 5 years. The reason was basically one of affordabiity.

Contrary to impressions that some would give, we are in fact operating within very real fiscal constraints and as a consequence we do have to make tradeoffs and we have to in fact prioritize.

Within those constraints, the decision was made that in fact we would retire the B–52D's and as a consequence save $850 million over the 5-year defense period.

The reason was because the B–52D's, as you know, are the oldest of our B–52 force—again, coming into the force about 25 years ago—and as a consequence they are the most limited in capability.

They are compatible with only gravity bombs and cannot carry the SSRAM—the strategic short-range attack missile—nor the ALCM. In addition they have a limited ability to penetrate since they do not have the upgraded offensive avionics system.

As a consequence they have a limited target selection. So, they did not withstand the priorities within the given resource for the Air Force and the decision has been made to retire them. They are still capable, especially in a conventional role, but they could not compete with the other programs.

To put it another way, there is not a billion dollars' worth of strategic programs or in fact of other Air Force programs that we would give up in order to retain the B–52D's.

At this point I would like to turn to General Burke with your permission, Mr. Chairman, and let him go through a review of our air-breathing leg programs.

General **Burke**. Mr. Chairman, Senator Goldwater, I am happy to be back.

To put this in context, this is the agenda of the briefing to be presented to this committee. We covered the theater nuclear forces, land-based deterrent, and are now moving into the bomber leg as well as into space systems, and strategic C^3.

In an earlier briefing we pointed out that other than looking at the people, modernization of the two legs of the strategic Triad which the Air Force is responsible for, has our highest priority.

I think that is as it should be. An important point is that, embedded in the strategic modernization program are the activities regarding updating of our bomber force, and that is what I would like to talk about this morning.

I would like to quickly remind the committee of what we have in the inventory today, a word about the readiness and sustainability of our force, and then I intend to spend the bulk of the time on modernization.

We have four main types of bombers in the Strategic Air Command today. Three types are versions of the B–52; we have 75 of the D's and they are the oldest, delivered back around 1956; there are 151 G's which were delivered to us in about 1959, and B–52H's, the newest—we have 90 of them and they came on board in 1962. We also have 60 of the FB–111's.

The strategic bombers are critically dependent on air refueling and that is provided by a force of 615 KC–135 tankers. Those tankers, in addition to refueling the bomber forces of course, provide the mobility and the reach for our tactical fighter forces and our airlift forces as well.

Senator **Goldwater**. May I ask, General, could you give us a broad guess as to when the National Guard KC–135's will be finished?

General **Burke**. Work is underway for the 28 KC–135's that are being reengined with the JT3D, as opposed to a CFM56. It will be done during 1982 and they will be in the units in 1983, Senator. I believe I am correct in that.

Senator GOLDWATER. Is the JT3D going to be close enough to the CFM56 to pay off?

General BURKE. It is some distance from the CFM56 in terms of performance. We calculate that a reengined KC-135 with a JT3D is worth about 1.15 the un-reengined airplane. But we calculate that reengining with the CFM56, that airplane is worth 1½ of the old. So, there is a considerable difference there.

Additionally because the CFM56 modification includes general upgrade work, we will be able to keep those airplanes well into the next century. The program includes things like a new landing gear which really does not have a whole lot to do with the engine. So, it is a somewhat more elaborate program.

There is also a fair difference in the environmental impact of the two engines. The CFM56 meets all the Federal air regulation requirements for the future. The JT3D will not meet those requirements, but does offer some improvement over the current engines. Civil carriers would not be permitted to fly the JT3D past 1985 under FAA regulations.

Senator GOLDWATER. What is the difference in thrust of the two engines?

General BURKE. My recollection is, it is about 18,000 pounds for the JT3D and 22,000 pounds for the CFM56. I will give you the quite precise numbers for the record, if I may.

Senator GOLDWATER. Thank you.

[The information follows:]

DIFFERENCE IN ENGINE THRUST

JT3D-3B, Thrust—18,000 lbs.
CFM-56, Thrust—22,000 lbs.

General BURKE. I just want to say a word about readiness and sustainability. The strategic bomber force has always been ready—"the" most ready element of all of our military forces, our strategic forces.

We have lately been paying more attention, though, to the sustainability of that force as it applies to the nonnuclear mission. The B-52, and certainly, the KC-135, have very important nonnuclear roles and missions, and we have been doing a lot more realistic training with them in that regard. We had a very interesting exercise last fall. We flew six B-52's nonstop from their bases in North Dakota, they dropped bombs in Egypt on target, on time. They returned nonstop to North Dakota.

We have bought a lot more spare parts for these airplanes in the last few years. In 1980 we bought 33 million dollars' worth of spare parts for all of the SAC forces; in 1982, that is up to $330 million, which is about a factor of 10.

So, we have done, I think, an important and useful thing for both readiness and sustainability of those forces.

FORCE MODERNIZATION

PRESIDENT'S PROGRAM	CONGRESSIONAL RESPONSE
IMPROVED CAPABILITIES FOR NEWER B-52's; RETIREMENT OF OLDER B-52's	REDUCED B-52 G/H FUNDING RECOMMENDED RETENTION OF B-52 Ds
DEPLOYMENT OF 100 B-1B's BEGINNING IN 1986	CUT $330 MIL
DEVELOPMENT OF ADVANCED TECHNOLOGY BOMBER	ADDED FUNDS
DEPLOYMENT OF OVER 3000 CRUISE MISSILES BEGINNING IN 1982	ADDED FUNDS
REENGINE KC-135 TANKERS	SUPPORTED ADDED JT3D

On that note I would like to move into the final segment, the things that we are going to do to modernize our bomber force. I think a useful way to look at this is first remind ourselves of what was in the President's program, in his strategic modernization package, and how Congress responded to it late last year.

The President asked to improve capabilities for the newer B–52's and in general that was supported by Congress, although they trimmed a little bit off; but the major effort they supported.

Retirement of older B–52's—that is the D's that Dr. Keel spoke of—Congress questioned the retirement of those in advance of the arrival of the B–1B, and that was modified. Rather than all going fairly soon, we will now retire three squadrons in 1983 and the other two will not be completely retired until the B–1B becomes available.

The President proposed deployment of 100 operational B–1B's beginning in 1986. Congress supported that, but as part of the budget adjustments took $330 million from that account. That has led to proposed reprograming action which this committee is considering just now.

The President said we should follow the B–1B with an advanced technology bomber. Congress agreed; in fact, added some funds for that. The same thing happened on the cruise missiles, Congress supported and added money for that.

The proposed reengining of the KC–135 tankers—300 of them at least—with the CFM56, Congress supported that, but added some additional money over and above that to reengine 28 KC–135's with a JT3D engine with the idea of getting those out and deploying them to Air National Guard units located at civilian airfields quicker.

Senator WARNER. Do you want to touch on, while you are on the tanker program, the CBO report?

General BURKE. Yes, sir, I am going to come to that.

Senator WARNER. Are you?

General BURKE. I am going to come back to that. That was just a broad outline and I have a few slides on that and will be happy to talk about the CBO report.

Senator WARNER. All right.

General **Burke**. B-52 modification, some major effort is under way there to keep those airplanes going. Even though we are beginning to retire some B-52's, we will retain others into the mid-1990's. So, that is a long way off.

It is worth remembering by way of perspective that we never kept, with the exception of the B-47, we have never kept another strategic bomber in the inventory longer than ten years. So, we are here in 1982 talking about keeping these airplanes another 11 or 12 years. So, we will obviously have to do something to do that.

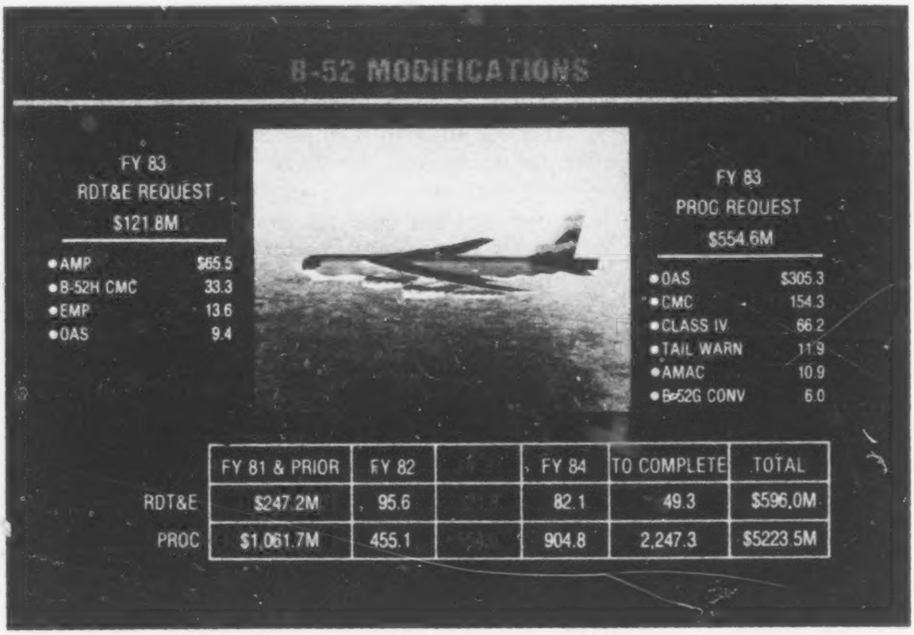
The most important thing is to modify them for a cruise missile carriage, a less demanding role, that will give us a number of extra years service from these airplanes. That requires avionics upgrades as well to provide for the electronic interface for those cruise missiles.

We are also doing reliability and maintainability improvements for the avionics and, indeed, we will have to continue to do that for the life of the airplane to keep it safe and viable.

Senator **Goldwater**. Is the number of B-52's modified to carry the cruise missile a classified number?

General **Burke**. No, sir, that is not classified. At the moment it is a handful, we are just beginning to get started. We had the delivery of the first one in June 1981. We had our first alert capability at Griffiss Air Force Base last September, and we have three aircraft already delivered.

We will have the first squadron of 15 completed at Griffiss by December, and then we will continue to modify some B-52G's, in time, all of the B-52H's.



B-52 MODIFICATIONS

FY 83
RDT&E REQUEST
$121.8M

• AMP	$65.5
• B-52H CMC	33.3
• EMP	13.6
• OAS	9.4

FY 83
PROC REQUEST
$554.6M

• OAS	$305.3
• CMC	154.3
• CLASS IV	66.2
• TAIL WARN	11.9
• AMAC	10.9
• B-52G CONV	6.0

	FY 81 & PRIOR	FY 82	[illegible]	FY 84	TO COMPLETE	TOTAL
RDT&E	$247.2M	95.6	[illegible]	82.1	49.3	$596.0M
PROC	$1,061.7M	455.1	[illegible]	904.8	2,247.3	$5223.5M

These are the budgetary numbers, the request that is pending before the committee and the Congress just now for fiscal 1983, some $121 million for research and development for B-52 modifications, and a little more than half a billion in acquisitions.

This is the aircraft modernization program, and that is basically to pool together in an integrated, systematic way all of the reliability and maintainability modifications that the B-52 will require. Included in that would be upgrades of the radar just for reliability and maintainability, basically replacing vacuum tubes that are terribly expensive with solid-state devices. Replacing the autopilot system. The B-52 has the same autopilot as we flew in the DC-6. We lost at least one airplane because of an autopilot malfunction and we are having continuing trouble with it. Those types of things are in that overall plan.

The cruise missile carriage work, shown here is for the Hs; we have already done the R. & D. for the G's. The EMP, or electromagnetic pulse hardening, we will be testing an OAS-modified B-52 this year in our EMP test facility in Albuquerque, managed by the strategic systems SPO.

These are the things we are buying. Most of the money goes for OAS and missile carriage; these are the reliability and maintainability modifications; a tail warning system that we are putting on B-52's so we know when they are being attacked with missiles.

Aircraft monitoring and control system corresponds and is necessary to the new safety features that are going into nuclear weapons.

B-52G CONVERSION

As B-52D's retire, SAC's proposal is to take 61 of the B-52G's and give them a primary conventional mission and in doing that they would like to modify them to carry conventional bombs externally. Right now they can carry 27 750-pound bombs internally. This would add 24, more of the same bombs, externally.

Moving into the B-1B, again, it is useful to remember that this program began as an initiative of the Congress. In the 1981 Defense Authorization Appropriation Act, moneys were provided, and the Secretary of Defense was instructed to embark on a program to field a new multi-role bomber with a certain set of characteristics; to have that bomber in the field as soon as possible but no later than 1987.

We have done that. Secretary Weinberger in response to a congressional directive proposed that the B-1B be that airplane, that it be built in a manner that would provide the flexibility that Congress is asking for, specifically to be able to carry cruise missiles and to do conventional bombing as well.

Our analyses and engineering tests convince us that this airplane would be capable of the most demanding missions that will include penetration of sophisticated air defenses well into the 1990's.

If it then becomes questionable for that role, it would remain very useful in other activities, conventional missions as well as cruise missile carriage well into the next century. We would expect to get 30 years or more service from this airplane. It will be available in the time specified. We are expecting the first squadron to be available in 1986.

B–1B Operational Enhancements

ALCM Carriage/launch.
Conventional weapons capability.
Expanded countermeasures.
State-of-the-art offensive system.
Higher gross weight (payload/range).
Improved engine start system.
Improved, longer-life engine.
Reduced RCS.

Some changes were made in the B–1A in arriving at this B–1B configuration. One of the most important—cruise missile carrying capability. They will have that capability internally and externally. They will also have a conventional weapons capability.

We are going to improve the countermeasures. This involves modular upgrades to what we have now which is a very successful defensive system in the B–1A. We have proved that, it has worked beautifully. But there are recent changes in Soviet air defense that will cause us to put some new modules on that.

The B–1A had an offensive avionics system that was largely taken from the FB–111 which at the time it was designed, 1970, was the best off-the-shelf avionics equipment that was available.

It would be foolish to put that in now because there is much better off-the-shelf equipment, and so we are going to take the best that is available in the inventory, which is essentially the things that we are putting in the B–52 plus a modified F–16 radar. We are not inventing anything new, but rather we are taking proven, available, capable systems for that.

We are going to be able to increase the gross weight from 395,000 pounds to 477,000 pounds, largely by just the stronger landing gear and that in conjunction with some of the aerodynamic improvements is going to give us a marked improvement in range and payload.

We had a problem, Senator Goldwater, you remember from your days of flying airplanes, with the engine start system, we were not satisfied with that. So, the APU's have been changed and that has been redesigned to address that problem.

We are going to make a little change to the engine to improve its durability and life, and importantly, we are going to make a very pronounced improvement in its radar cross-section, and that, in combination with the first-rate electronic countermeasure system, are the major features that cause us——

Senator Goldwater. What engine are you going to put in this?

General Burke. It is the F–101 with just relatively minor modifications. It is 80 percent common with the engine you flew, but there are some things that General Electric has discovered in their commercial work, parts that they changed, that will give us longer life.

Senator Goldwater. About 28,000 pounds?

General Burke. No, 30,000, sir.

Senator Goldwater. Do you want to add any thrust?

General Burke. No, sir. There is plenty of thrust there.

Senator Goldwater. I know.

General Burke. These are milestones to which we are working: The President of course made his decision on October 2 and Congress approved the B-1B activity in December. There was a legislative requirement that the President certify that we can do this on schedule and cost; that was done in January.

We are now under contract with Rockwell and soon will formalize the contract with the other associates.

We will begin flight tests in July of 1983 with a modified B-1A. We are going to take the fourth B-1A, pull out its avionics and put in the new. So, that will be the avionics testbed, if you will, and that will start flying then.

The first B-1B we expect to rollout in 1984 and fly in April of 1985. The first squadron will be available in 1986, and we will complete the hundred airplanes by December 1988.

I might just add that these are contractually binding numbers, and internally we are working to meet those about 3 to 6 months early.

Senator GOLDWATER. Have they started work yet?

General BURKE. Yes, sir, we have started production.

Senator GOLDWATER. The four aircraft that we have where do they fit into the program?

General BURKE. The number four will be the avionics test platform.

Senator GOLDWATER. It will be the B-1B, the first one?

General BURKE. It will not be. In its flight-test mode it will still be a modified B-1A. In time we could expect to make the necessary modifications to No. 4 and put it in the SAC inventory. It could become an operational airplane.

Senator GOLDWATER. Has No. 4 flown much?

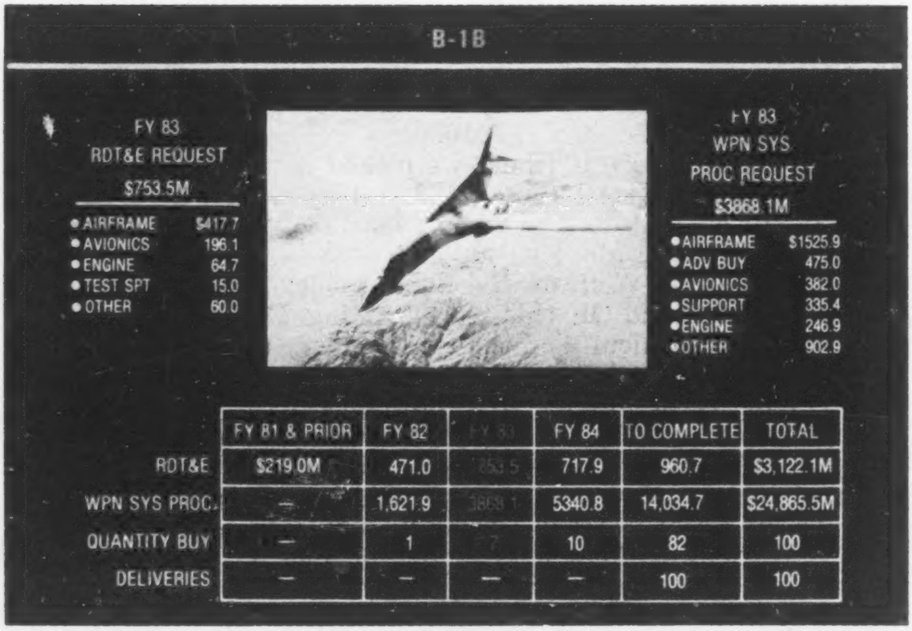
General BURKE. Oh, yes, sir.

Senator GOLDWATER. How many hours do you think they have on it?

General BURKE. We have about 1,900 hours total on all four B-1As, and I would guess at about 380 hours on the fourth airplane.

Senator GOLDWATER. Now, those all have terrain-following radar now, do they not?

General BURKE. Three do. It has a dedicated terrain-following radar now, and one of the improvements when we go to the F-16 radar, we go to a time-sharing mode and do that job.



B-1B

FY 83
RDT&E REQUEST
$753.5M

• AIRFRAME	$417.7
• AVIONICS	196.1
• ENGINE	64.7
• TEST SPT	15.0
• OTHER	60.0

FY 83
WPN SYS
PROC REQUEST
$3868.1M

• AIRFRAME	$1525.9
• ADV BUY	475.0
• AVIONICS	382.0
• SUPPORT	335.4
• ENGINE	246.9
• OTHER	902.9

	FY 81 & PRIOR	FY 82	FY 83	FY 84	TO COMPLETE	TOTAL
RDT&E	$219.0M	471.0	753.5	717.9	960.7	$3,122.1M
WPN SYS PROC.	—	1,621.9	3868.1	5340.8	14,034.7	$24,865.5M
QUANTITY BUY	—	1	7	10	82	100
DELIVERIES	—	—	—	—	100	100

The request for 1983 is shown, it is for seven aircraft. The procurement account listed $4 billion and $750 million for research and development. As you would expect, at this point in the program there is a great deal of start-up cost. The money is divided as shown here, and there is nearly a billion dollars in tooling and non-recurring costs to get the program started. Research and development is divided as shown on this chart.

Senator GOLDWATER. What is going to be the fly-away cost of your first one?

General BURKE. Fly-away cost of the first or of the program?

Senator GOLDWATER. The first one.

General BURKE. It is a little hard to talk about it, we will have invested $560 million by the time we get that first airplane; but we will have of course had a great deal of start-up cost.

Senator GOLDWATER. We are talking about what now, a $200 million bird?

General BURKE. Total program cost in 1981 dollars is a $200 million airplane. The incremental cost, if you wanted to buy the hundred and first airplane is what, less than half that?

Th 101st airplane will be $93 million.

Senator GOLDWATER. I remember when we talked $28 million.

General BURKE. That was a long time ago. That was when you could get a Chevrolet for $4,000.

Senator WARNER. Now, there is a reprograming action up here which would delete from the fiscal year 1982 budget one of the aircraft; is that correct?

General BURKE. Yes, sir.

Senator WARNER. So that figure seven for procurement cost, does that take into consideration the dropping of that second bomber?

General BURKE. That is 1983.

Senator WARNER. I know.

General **Burke**. No, Sir.

Senator **Warner**. It does not.

General **Burke**. But this does. The profile was two, seven, nine.

Senator **Warner**. Right.

General **Burke**. And you accepted that reprograming request.

Senator **Warner**. So, it is 1, 7, 10.

General **Burke**. Here is where we picked it up, that is of course because we have to get the long lead and we cannot do it in fiscal year 1983 but we will do it in fiscal year 1984. With that going on, we are back on the original schedule.

Senator **Warner**. Well, on the Senate side it looks like we are going to go ahead and OK this reprograming. Do I understand you are encountering difficulty on the House side?

General **Burke**. We have had some questions. I do not really anticipate we are going to have great difficulty.

Senator **Warner**. That is a fairly major reprograming action. How did that occur?

General **Burke**. As a consequence of Congress cutting $330 million from the fiscal year 1982 request, including $179.1 million of the R. & D. request. That is critical. You have to do the R. & D. and you have to do that up front.

So, we came up with a plan that would allow us to stay within the budget and on schedule by not buying the second airplane in 1982, taking $179 million of that and putting it back into the R. & D. and another $30 million then goes into long lead to protect these airplanes.

There is no change in the total 1982 appropriation, we are not asking for additional money.

Senator **Warner**. I understand.

General **Burke**. We are just shifting money.

Senator **Warner**. Procurement to R.D.T. & E.

General **Burke**. To R.D.T. & E. primarily, yes. Nor does this affect the overall estimate of costs of the program. In fact, if we do not do it, we would project it would go up.

ATB STATUS

A word about the bomber that has low observability or stealth as a major design goal. We have selected and announced a contractor study team last fall headed by Northrop, which involves General Electric as a participant. We have our management effort under way. We are refining and defining a program now, looking at the desired characteristics that normally one would at this stage.

Most of our focus is on what we call risk reduction before we go into full-scale development to make sure that we have minimized the number of unknowns that we are going to have to deal with and make sure we are on a firm foundation before we embark on this program.

We are looking to see it in the early 1990's, we are on track for that, and we continue to think that is about the right phase to be in.

Moving into the air-launched cruise missile area——

Senator **Warner**. Before you leave the ATB, are there any benchmarks this year and fiscal year 1983, that were not anticipated when you made your presentation in fiscal year 1982?

General **Burke**. No, sir.

Senator **Warner**. No surprises, no changes, everything that we planned in fiscal year 1982 is right on course.

General **Burke**. Yes, sir. We have a funding issue, but I think perhaps we could talk about that later on in the executive session.

Senator **Warner**. All right.

General **Burke**. The ALCM program, has met with great success in the past year.

Senator **Warner**. What firm date do you use for ATB IOC now, publicly? Is that still classified?

General **Burke**. I think the early 1990's is probably the right answer. It is probably right in terms of our ability to estimate, the early 1990's.

Senator **Warner**. The early 1990's. All right.

AIR LAUNCHED CRUISE MISSILES

General **Burke**. The cruise missile had a very good year. We did make our first capability in September, we will have a squadron ready to go in December of this year; complete the buy by 1990. We will be carrying cruise missiles on a number of B-52G's and the Hs, plus the B-1B's. We can carry a maximum of 20 on the B-52, eight internally and twelve externally; and that loads the airplane out when that is so configured.

The B-1B can carry 22 cruise missiles, eight in the forward bomb bay and 14 externally. It still has an aft bomb bay in which you could carry up to eight gravities, and so forth.

Air Launched Cruise Missile

FOLLOW-ON TEST AND EVALUATION PROGRAM

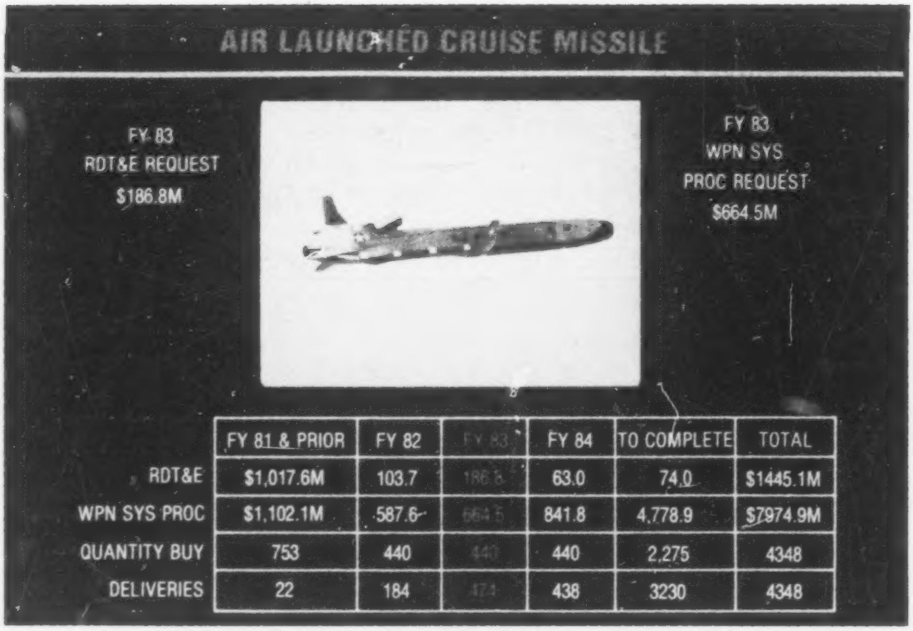
Program description—20 flight program, reliability/performance/survivability, and avionics interface.

Test results to date—13 successes, 1 partial, and 3 failures.

Status—next flight July 1982, FOT&E phase 1—complete September 1982, and FOT&E phase II—SAC/AFTEC begins October 1982.

A year ago you and I, Mr. Chairman, shared concerns as to the flight test program. We had had three early failures at that point in the test program. Since then, it certainly has a record of considerable success. The last 10 flights have all been successful.

The early flights were flown in B-52's that were juryrigged to accommodate the test. We now have the modified B-52's that we are testing with, and we are six of six on that testing. That is very encouraging. That flight test continues and will for the life of the system. But, I am very pleased with what we have done this past year.



AIR LAUNCHED CRUISE MISSILE

FY 83
RDT&E REQUEST
$186.8M

FY 83
WPN SYS
PROC REQUEST
$664.5M

	FY 81 & PRIOR	FY 82	FY 83	FY 84	TO COMPLETE	TOTAL
RDT&E	$1,017.6M	103.7	186.8	63.0	74.0	$1445.1M
WPN SYS PROC	$1,102.1M	587.6	664.5	841.8	4,778.9	$7974.9M
QUANTITY BUY	753	440	440	440	2,275	4348
DELIVERIES	22	184	474	438	3230	4348

In our request for 1983, that is highlighted here, we are proposing to buy 440 missiles, we actually get delivery on a few more than that from the previous buy.

If you compare this with the proposal for 1982, you will see that this has gone up very substantially, and that reflects our proposal that we begin serious work on either an improved version of this cruise missile or a followup version in the future. We will be talking about that more in the later session.

KC-135 REENGINING

Turning now to the subject of KC-135 reengining. The Air Force believes—and has done a number of studies with OSD—and Congress in the past has agreed that reengining of the 135's is the least expensive way to add badly needed refueling capability.

We need more refueling for SAC; we need more refueling for the tactical fighter force; we need more refueling for our airlift. Refueling is, I think, the finest force multiplier that we have available. It gives us great capability to extend the reach and power projection capability of our forces.

We are very short on it. We have added many, many refuelable airplanes with no change in the refueling capability. We are satisfied that, contrary to the CBO findings, the CFM56 reengined KC-135 is the lowest cost answer.

Additionally, it adds a lot of operational flexibility. Right now an unreengined KC-135 with a full load of fuel needs 12,000 feet of runway, and there are not many runways of that size. So, you have to really download very substantial amounts of transferable fuel to get them off the runways.

With reengining, we now have a lot more runways that we can operate out of. We are no longer dependent on the water injection, and suitable water is hard to find in overseas locations. We also solve our increasing environmental problems. The KC-135A is actually noisier than the Concorde and you get complaints, not only in this country, but around the world on that.

Very importantly, it saves fuel. There is about 25 percent less fuel consumption compared to the unreengined airplane. If we modified the whole force, it would save the country 100 million gallons of fuel a year. Modification began last month and we will get our first airplane this August.

I read about the CBO study over the weekend in the newspaper, got a copy this morning and had a cursory look at it. Some of our people have examined it. We have substantial differences of opinion with the CBO. We will furnish them our review and comments concerning the report and will be happy to furnish that to the committee.

Senator **Warner**. We will need that for markup session.

[The information follows:]

CBO STUDY ON KC-135 REENGINING

The Air Force has completed its initial assessment of the Congressional Budget Office (CBO) Aerial Tanker Force Modernization Study. The CBO study examined three alternative tanker force options: (Option One) the Administration's program to modernize/reengine approximately 300 KC-135 tankers with CFM 56 engines (KC-135R) and purchase an additional 44 KC-10s; (Option Two) a CBO force that terminates the CFM 56 program, reengines 185 KC-135s with donor JT3D engines (KC-135E), and purchases 44 additional KC-10s; and (Option Three) a CBO force that limits tanker modernization to an additional 44 KC-10 procurement only.

Our analysis does not support many of the CBO conclusions. The CBO projected tanker demand is significantly understated. The impact fails to account for the impact of not modernizing the KC-135A force. Cost-effectiveness conclusions are based primarily on near-term investment costs rather than total force investment and continuing ownership costs. The CBO study also employs the KC-10 in the strategic nuclear mission role without considering the impact on the airlift acquisition strategy. The KC-10 was purchased as a force projection asset, not to support directly the strategic nuclear mission When acquisition and ownership costs, tanker demand and capability, tanker modernization, and mobility requirements are accounted for, Option One is the most cost-effective option.

AERIAL TANKER DEMAND

Total tanker demand is a function of strategic nuclear and general purpose requirements. The CBO study has the current and projected tanker requirements significantly less than the actual requirements.

Congressional Budget Office estimates for tanker requirements to support strategic nuclear forces do not reflect the complexities of strategic nuclear planning. The CBO study fails to include a large number of important variables and is based on a most optimistic approach. Air Force estimates are based on 30 years of practical experience in determining refueling requirements. Those requirements far exceed the CBO projections.

The CBO general purpose tanker requirements are much lower than Air Force requirements. The study assumes a low demand to support NATO operations. Air Force studies have validated NATO tanker demand well in excess of 200 aircraft over the duration of the conflict. The CBO study also understates tanker demands to support a Rapid Deployment Force deployment because it assumes average demand of F-15 squadrons alone, rather than a mixed force and does not account for attrition fillers. In a Persian Gulf scenario, tanker requirements would be approximately twice the CBO requirements. The CBO study also fails to address the possibility of simultaneous conflict in separate theaters of operation.

TANKER CAPABILITY/MODERNIZATION

The CBO study states that Options One, Two, and Three provide excess tanker capability beyond 1987, 1989, and 1991, respectively. Based on Air Force projected tanker demand, none of these options provide excess capability and only Option One meets the Air Force moderate risk demand. Neither of the CBO options meets the Air force moderate risk requirements and neither approaches the low risk requirements. Option One is the only tanker force that gives the Air Force the capability to tailor its tanker capability to support requirements in the 1990s and beyond.

Only Option One provides a comprehensive modernization program for the KC-135 fleet. The KC-10 provides substantial new capability quickly and the KC-135/CFM56 program solves critical engine problems of the present J57 engine, while also modernizing 34 major systems or subsystems.

Option Two with JT3D reengining is not a total KC-135 modernization program and fails to correct all the KC-135 deficiencies. Meeting the Air Force's moderate risk force would exceed the total worldwide inventory of the lower cost JT3D engined 707-100/720s. The Air Force would be forced to procure about 100 of the higher cost 707-200, 300, 400s to meet this option. There are also unanswered questions concerning the maintenance status of those engines.

Option Three only modernizes the force with KC-10s and eliminates any reengining effort. Without CFM56 reengining the Air Force would be forced to seek up to $1.2 billion to insure a completely reliable J57 engine. With that, the J57 would remain 1950 technology, a noisy, dirty and extremely fuel-inefficient engine. The operations and support cost of continuing to operate the KC-135A make Option Three the least cost-effective option, rather than the most cost-effective.

TANKER FORCE COST-EFFECTIVENESS

Tanker force cost-effectiveness is a combination of acquisition, operating costs, and tanker improvement factors. The CBO cost-effectiveness conclusions were based primarily on acquisition costs rather than the total costs of acquiring and operating a total force over time. When a comprehensive, life cycle approach is used, Option One is the most cost-effective approach, Option Two is second, and Option Three becomes the least cost-effective approach.

A detailed analysis of life cycle costs for the KC-135 is included for comparison. This further refines Air Force analyses provided to the House and Senate Appropriations and Armed Services Committees in December 1981. The CBO study differs in assuming a 43 percent improvement for the KC-135R versus 50 percent used by the Air Force. It also assumes improved fuel efficiency of 21 percent for the KC-135R versus 25 percent. Life cycle costs are sensitive to these changes. Air Force analysis indicates the KC-135R provides an improvement in capability that ranges from 40 to 200 percent, depending on the length of the refueling mission. The aggregate improvement of 50 percent used by the Air Force is conservative.

In summary, the administration's program to reengine approximately 300 KC-135's through 1987 with CFM56 engines and purchase an additional 44 KC-10's is the most cost-effective option when total force costs are considered. It is the only program that will meet the moderate risk demand for air refueling in the 1990's. Finally, it is the only option which modernizes the KC-135.

20-YEAR TANKER LIFE CYCLE COSTS PER PAA

[Constant fuel costs in millions of fiscal year 1981 dollars]

Cost category	KC-135A	KC-135E	KC-135R
Acquisition		4.2-7.3	15.0
Modification	2.9	.8	.8
20-year operation and support (except fuel)	21.0	18.5	18.7
20-year fuel	16.7	14.7	12.5
20-year life cycle	40.6	38.2-41.3	47.0
20-year life cycle factored to KC-135A equivalent	40.6	32.6-35.3	31.3

10 PERCENT ANNUAL FUEL COST GROWTH

Cost category	KC-135A	KC-135E	KC-135R
Acquistion		4.2-7.3	15.0
Modification	2.9	0.8	0.8
20-year operations and support (except fuel)	21.0	18.5	18.7

10 PERCENT ANNUAL FUEL COST GROWTH—Continued

Cost category	KC-135A	KC-135E	KC-135R
20-year fuel	63.7	56.0	47.8
20-year life cycle	87.6	79.5–82.6	82.3
20-year life cycle factored to KC-135A equivalent	87.6	69.9–70.6	54.9

EQUIVALENCE RATIO

In the aggregate, 1 KC-135R (CFM 56) equals 1.5 KC-135A's and 1 KC-135E (JT3D) equals 1.17 KC-135A's.

FUEL EFFICIENCY

Compared to the baseline KC-135A, the KC-135R is 25 percent more fuel efficient and the KC-135E is 12 percent more fuel efficient.

General **Burke**. I would say the basic differences are two. One, they have first laid out a very different war plan than SAC has. On what basis they did that I do not know, but it had some obvious errors in such things as, they were assuming that the tankers, would take off with a full load of fuel from some bases such as Sky Harbor. If they put that much on it, they are not going to get off the ground from there. But then they laid the war plan very differently than SAC.

Second, their cost estimates are different enough from ours to come up with different answers. I have pretty good confidence in ours because when the previous administration took office, I know it was Harold Brown's intuition that the KC-10 was less expensive than the reengined 135, and we had about a year's systems analysis review before we embarked on this program.

Senator **Goldwater**. If the runway temperature is over a hundred, the present KC-135 will not take off with a full load. That is the major reason that we are interested. We fly so many support missions for the fighter groups and we cannot do the full job without the full horsepower from the new engines. You are all aware of that.

General **Burke**. Indeed.

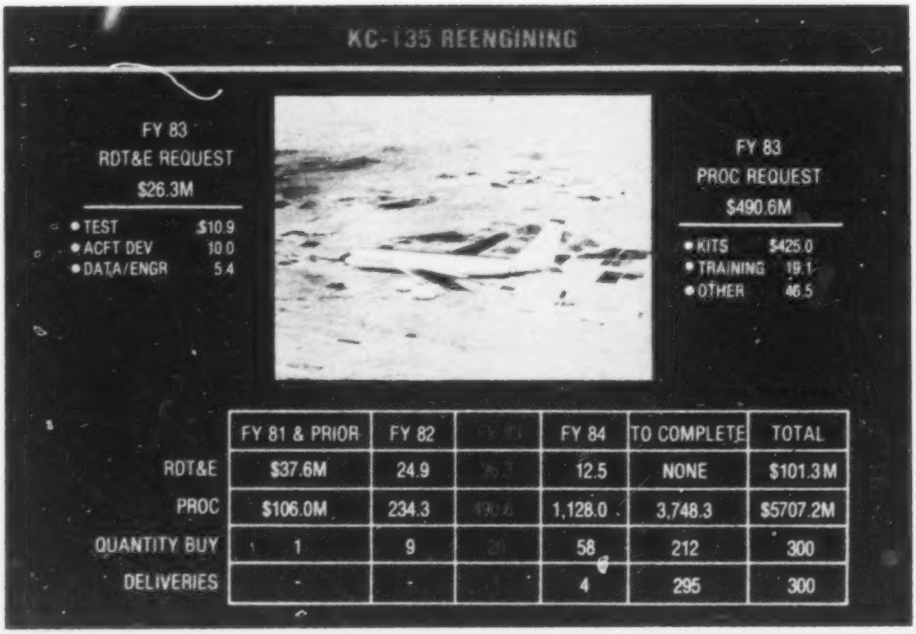
Senator **Goldwater**. That is true in any of our southern bases.

General **Burke**. It is true of any base at which you are much above sea level. If you combine that with a little heat it does not have to get up to 100 degrees.

We have airplanes, 135's, on alert at a number of locations—including active duty bases—with significantly less than full tanks.

Senator **Goldwater**. Let me ask you a question before you get started. This is the KC-135? Go ahead.

General **Burke**. Yes, sir, I am getting pretty close to the end of my presentation here.



KC-135 REENGINING

FY 83
RDT&E REQUEST
$26.3M

- TEST $10.9
- ACFT DEV 10.0
- DATA/ENGR 5.4

FY 83
PROC REQUEST
$490.6M

- KITS $425.0
- TRAINING 19.1
- OTHER 46.5

	FY 81 & PRIOR	FY 82	FY 83	FY 84	TO COMPLETE	TOTAL
RDT&E	$37.6M	24.9	26.3	12.5	NONE	$101.3M
PROC	$106.0M	234.3	490.6	1,128.0	3,748.3	$5707.2M
QUANTITY BUY	1	9	20	58	212	300
DELIVERIES	-	-		4	295	300

We have a proposal for a little less than half of a billion dollars for procurement for reengining purposes. We show buying 20 kits. In the negotiation on that right now that is the minimum number; I think that might go as high as 25. We intend to move this program—do two things with this program.

One, to make it a multiyear procurement and two, to operate it at the efficient production rate which is six a month, 72 a year, and we are moving to that.

Senator GOLDWATER. Your total inventory is about 600?

General BURKE. The 615 is PAA, UE is about 642.

That completes my prepared remarks.

Senator GOLDWATER. Let me ask you before you sit down, how many KC-10's would it take to move a squadron of F-15's overseas, that is to Europe?

General BURKE. To Europe, you could do that with about six or eight.

Senator GOLDWATER. It would take that many?

General BURKE. Yes, sir. That is not only refueling, that is also carrying their people.

Senator GOLDWATER. That is refueling, and spares, and personnel?

General BURKE. Yes, sir, all of that.

Senator GOLDWATER. Six or eight.

General BURKE. Yes, sir.

Senator WARNER. Senator Goldwater, we will now go to questions. Would you like to lead off with some questions, or have you paced your questions in the presentation?

Senator GOLDWATER. I have no other questions.

Senator WARNER. Then I will proceed. Following the 10-minute rule, we will try and finish these questions in about 25 minutes.

Senator Levin, you have joined us, but I will start off and then will turn to you in 10 minutes.

I will address the question to the panel and, Secretary Keel, you can determine how best to allocate the answers.

First, let us discuss the thoughts that have been circulating in recent weeks about a substantial cost growth that it is alleged has already occurred in the B-1B program. You are familiar with the Cost Analysis Improvement Group. Why not just start with that?

Dr. KEEL. Yes, sir. I think the first thing to realize, Senator, is that ironically in all of the cost reports that have been reported on in the media, that there is very little disagreement on cost, there is just disagreement on what you would put in the aircraft.

Senator WARNER. You mean what you get at the other end of the production line?

Dr. KEEL. That is correct. In other words, the way we have put it previously is that if, for example, we were to produce the GAO aircraft with the CBO inflation rate, it would cost what they say. But we have no intention of producing the GAO aircraft.

Senator WARNER. You are talking about two different airplanes?

Dr. KEEL. I am talking about two different airplanes.

Senator WARNER. How can such a fundamental error be made?

Dr. KEEL. Well, I guess it is a matter of perception and accounting. The first thing to realize, Senator, it was not a GAO report. I believe they called it a "preliminary status assessment," a "draft preliminary status assessment" or something to that effect, as opposed to a report.

They had three different categories, one being possible additions to the program. One of those, in fact one of the major ones in that possible addition category was the addition of cruise missiles. As a matter of fact, we have already decided to add the cruise missile carriage to the aircraft and that is part of our $20.5 billion baseline cost

There are a number of other things which are growth options but which we have no intent to pursue at this time, and hence are not part of our baseline program.

In addition, they had several items that they call "questionable reductions." The major one of those was our savings for multiyear procurement and they are right, if we do not go multiyear we will not save roughly $1 billion on the program.

It is our full intent to go multiyear and of course this administration, as you know, one of their primary initiatives was a commitment to multiyear procurement.

It is anticipated with going to multiyear on the lots 3, 4 and 5, we will save on the order of $1 billion on this program.

They made reference also to other charges outside the program, and in fact there are other charges outside the programs—as is normally the case for aircraft procurement programs—because of good management practice and efficiencies, there are things of like nature that you put together—such as manufacturing technology initiatives to increase productivity; such as facilities improvement; such as engine component improvement programs and so forth.

So, we do have some items related to the B-1B properly accounted for in those programs and properly budgeted which amount to, in total, less than a billion dollars.

So, I think for the most part it is first a matter of which aircraft are we building. Two, what is the inflation rate or are you talking in terms of constant dollars or inflated dollars; and then finally, the assumptions that are used and where the funds are accounted for.

Senator **Warner**. Have you actually sat down with Mr. Bowser or someone and said, "Let us get a common airplane so at least we can have a comparison of the same aircraft." Are you working in that direction?

Dr. **Keel**. Yes, sir.

Senator **Warner**. You may have different opinions on cost, but it is just absurd that we are dealing with two different airplanes.

Dr. **Keel**. We have talked with him and as a matter of fact, there really is not a basic disagreement on what the baseline aircraft will cost. They have questioned some of our assumptions, one of them again being a multiyear assumption. They have questioned some of our learning curve assumptions which we have very high confidence in and which independent cost analyses within the Air Force have confirmed.

Senator **Warner**. Was that the Cost Analysis Improvement Group?

Dr. **Keel**. It is what we call the ICA—Independent Cost Analysis Group. There is an OSD CAIG which is an independent cost assessment group.

Senator **Warner**. Do they have some different views?

Dr. **Keel**. Well, the OSD CAIG made no official recommendation but Mr. Margolis, who is part of this group, made a recommendation and in fact he recommended that our baseline program be increased $2.4 billion in constant dollars; $800 million of that was for the cruise missile carriage. That is now part of the baseline program.

Another $800 million of that was our savings that we are anticipating for multiyear. It was our judgment and the Secretary of Defense's judgment that we are committed to going multiyear and hence we should properly take credit for those savings; $300 million of that was for simulators. We are budgeting the simulator, we are doing it under a separate line with a separate program office, the Simulator Program Office, to potentially encompass a number of aircraft programs. So, that has been budgeted but outside the baseline program.

The remaining $400 million or so had to do with depot maintenance and our concept for depot maintenance, whether it would be in three levels or two levels of maintenance; whether it would have an organic maintenance capability. We have $1.8 billion in the baseline allocated for maintenance for the B-1B program.

But is it our intent now to go organic. If there is any interim support necessary as we develop the organic capability, we intend to in fact use contractor support—what is called interim contractor support. That will properly be funded, as is normally the case, through the Air Force Logistics Command and other lines in the budget. So, that has not been added to the program.

Senator **Warner**. Do you have anything to add to that, General?

General **Burke**. Only to say, perhaps you also had in your mind reference to the syndicated column that alleged that the cost had gone up $600 million. They subsequently issued a correction that said it was $300 million rather than $600 million. They are both wrong, there is zero cost increase. I talked with that columnist and asked him where it came from. He said a congressional source. When he elaborated a little, he apparently identified the fact that the fiscal year 1983 request is larger than it was indicated it would be in the fiscal year 1982 budget, but that in turn is a consequence of the congressional reduction of $330 million in fiscal year 1982.

The total program cost remains the $20.5 billion in 1981 dollars.

Senator Warner. You are absolutely coming down firm, there is no cost growth in the B-1B program?

General Burke. Absolutely. There is absolutely none. I would say everything that has happened to date has reinforced our confidence. We thought we understood this program very well and what it would cost. We have, since the discussions here last November, negotiated contracts—not firm but fixed price incentive fee contracts.

Senator Warner. We want to get here on the public record—to the extent we can—if there is any doubt, get it removed that the B-1B program is taking money out of the ATB program.

Are both of those programs funded, in your judgment, adequately to meet the schedule as represented by the Department of the Air Force to the Congress?

General Burke. That is absolutely so, sir. We made a judgment—necessarily as a judgment—as to what is the fastest prudent pace to develop the ATB. Then we fully funded to that.

Now, people can and do argue whether our judgment was right, but it was our judgment and we think it is right, and we continue to believe it is. But there is no argument that it is fully funded to that base. We have not removed a nickel from that account to the B-1B.

Senator Warner. So, you are in compliance with both the letter and the spirit of the law. There is a specific prohibition on the diversion of resources approved by the Congress from the ATB to the B-1B.

General Burke. And we do so with enthusiasm.

Senator Warner. All right. My time is up, I want to hold rigidly to time. Senator Levin?

Senator Levin. Thank you, Mr. Chairman.

Last week we were given the IOC of the Stealth bomber in public session. Are you aware of that?

General Burke. Yes, sir.

Senator Levin. Was that a classified figure that was given to us in public session by Secretary DeLauer?

General Burke. We discussed last year that the Secretary of Defense is the ultimate authority in our business for classification and declassification.

Senator Levin. So, he had a right to declassify it at that time.

General Burke. Yes, sir.

Senator Levin. What was the figure then, that is now being used since it has been declassified?

General Burke. I was not present, but I understand he did use a number.

Senator LEVIN. All right. Let me just clear up one bit of testimony from last week that you gave us. As I understand it, the D-5 missile is now being looked at as a possible missile for the deep underground basing mode; is that correct?

General BURKE. Yes.

Senator LEVIN. And is it also being looked at as a possible missile to be deployed on land with ballistic missile defense, BMD?

General BURKE. No, sir.

Senator LEVIN. Why not?

General BURKE . There is no particular attraction to looking at it in that capacity. There might be an argument for having that somewhat smaller size to relate to that technology of boring deep underground. But there have been a number of studies and evaluations made of a common missile and it turns out that you really cannot make a common missile.

Senator LEVIN. Is there any attraction to looking at it for the continuous patrol aircraft?

General BURKE. No. Again, we have looked at it. We talked about that sometime ago when we were looking at other airborne versions of MX's and again, it turned out to be less costly to go with a somewhat larger and more capable missile.

Senator LEVIN. So, it is not being looked at for the CPA either.

General BURKE. No.

Senator LEVIN. Relative now to the Stealth bomber, is that program a high-risk program in your opinion, a high-risk technology program?

General BURKE. There is no one feature of it that I would identify as high risk. There are a number of features that I think are moderate risk. When you combine the several you might say that based on experience we are probably going to stub our toe once or twice before we get there.

Senator LEVIN. But you would not classify it then, as a high-risk technology program?

General BURKE. I just do not know. It is many times riskier than the B-1B program would be.

Senator LEVIN. Pardon?

General BURKE. These words imply a great deal more precision than I think is really in there—moderate, high.

Senator LEVIN. You would not personally use the term, then, to apply to the B-1 program?

General BURKE. I think it is an inadequate word.

Dr. KEEL. Can I add a little leverage, Senator? It really depends on schedule as to assessment of risk.

Senator LEVIN. I mean the present IOC.

Dr. KEEL. With the current IOC for the ATB I would classify it—there are like six categories of risk. I would say overall it is moderate, an acceptable risk.

Senator LEVIN. So, given the current IOC it is not a high-risk program in your opinion.

Dr. KEEL. That is correct.

Senator LEVIN. All right. Let me get into the B-1B area, then, i terms of the baseline program and its costs.

One question before I do that, and that has to do with the B-52D's. We put money in the budget to maintain that program, and

I understand that your budget says they are not going to be maintained. Are you going to come in for a budget rescission?

General Burke. The proposal, Senator, is to retain some. I do not think the congressional direction was specifically to retain all of them until the B-1B's were available.

Senator Levin. But did we not put money in there to retain all of them?

General Burke. For a year, I think, and we are of course. The original plan was to retire three squadrons in 1982, this year, and two in 1983. That has been pushed back to the right, retire three squadrons in 1983 and one in 1985.

Senator Levin. You are not planning to come in for a rescission on any of the money that we appropriated.

General Burke. I do not think there is a rescission. I think there may be a bit more than is necessary, but I think we would propose to use that within the B-52 program, use it for the G's and H's.

Senator Levin. All right. On the B-1 baseline costs. You are developing, as I understand it, a common strategic rotary launcher—we will just call this a launcher for the moment—for the internal carriage of nuclear weapons for the B-52's, the B-1B's, and the Stealth bomber; is that correct?

General Burke. Yes, sir.

Senator Levin. And none of the costs for this launcher are being attributed to the B-1B baseline cost; is that correct?

General Burke. No; there is money in the B-1 program for the procurement of those.

Senator Levin. I think this is one of the GAO's points. Part of the $1.2 billion that you are talking about for procuring 300 of those launchers for all 3 of those bombers is in the $20.5 billion baseline cost for B-1B.

General Burke. We actually have moneys to procure 200 launchers and 100 fuel tanks. You could mix those however CINCSAC would like. That would fill up the fleet.

Senator Levin. How much of the $20.5 billion is in there for the launchers? Just a rough figure in dollars. How much of the $20.5 billion is in there for the common launchers?

General Burke. Col. Jim Evatt.

Colonel Evatt. Sir, there is about $1.3 million per aircraft for common launchers.

Senator Levin. In the $20.5 billion.

Colonel Evatt. Yes, sir.

Senator Levin. Thank you.

You indicated that you are funding ALCM, the ALCM costs in the B-1B baseline figure. My next question relates to these portions, these ALCM-related items and I will read a number of them—it is kind of technical, but if you can follow it I would appreciate it.

Are these items related to the ALCM included in the baseline cost: Aircraft changes such as wiring, interface units for aircraft and missile computers to exchange information which is necessary for internal ALCM carriage?

Next, development and procurement of ALCM-related ground support equipment peculiar to the B-1B.

Next, retrofit of the external ALCM carriage and launch capability for the first 18 production aircraft?

Are those items that I just mentioned part of the $20.5 billion baseline cost?

General BURKE. I will just make a general statement and ask Colonel Evatt, who is our project manager for the B-1B, to elaborate.

The things that are identified with the B-1B are in the B-1B program, such as the modifications, the black boxes that go into the airplane; the things that are associated with the missiles, the ALCM missiles. The support equipment would be common whether or not it is carried on a B-52 or a B-1B.

I am unaware of anything that would be different there, but the traditional manner of presenting those items that are unique support equipment for a cruise missile is to carry them as part of that cruise missile. Perhaps Colonel Evatt would say a few more words.

Colonel EVATT. Sir, all the B-1B peculiar things are funded within the $20.5 billion.

Senator LEVIN. And the common items are not.

Colonel EVATT. Well, sir, if you refer to a loader or support equipment, we would fund that portion within the $20.5 billion that supports the B-1B. We would not fund that portion that supports the B-52 or the ATB.

Senator LEVIN. The training simulators for the B-1B are not included in the baseline; right?

General BURKE. No, sir. As we discussed last year, training simulators are not. That is going to be on the order of a $300 million program.

Senator LEVIN. You separated that out. You created a new Simulator Office; is that right?

General BURKE. We did that many years ago. We did it around about 1975 or 1976. We reached the conclusion that simulators are very important and warrant central management. In the future the Air Force intends to procure the simulator apart from new aircraft procurement.

Senator LEVIN. And it has not been doing so for the last 6 years.

General BURKE. Well, we have purchased simulators using both approaches, through the simulator SPO, and find it more effective to procure them apart from the aircraft.

Senator LEVIN. That is not a new decision.

General BURKE. No.

Senator LEVIN. Last year you told us, General, that full aircraft fuselage fatigue testing is not going to be done on the B-1B; is that still true?

General BURKE. The necessary testing has been done.

Senator LEVIN. But no additional fatigue testing will be done on the B-1B?

General BURKE. That is correct.

Senator LEVIN. My time is up. Thank you, Mr. Chairman.

Senator WARNER. Thank you, Senator Levin.

Gentlemen, as you know, during my trip out to the laboratories at Sandia, Los Alamos, and on down to Texas I repeatedly stated my growing concern over the safety both in handling and in operational use of certain atomic weapons loaded on the air-breathing leg.

I have expressed the view that in our modernization program we should look at dropping older systems out, and to the extent we want to retain some of the older systems, modify only sufficient quantities as needed for, say, our peacetime alert scenario.

Have you been able to give that further thought, and do you have any comments here this morning on, (a) dropping systems out, and (b) modification of only a limited number of weapons we need for the alert program, thereby putting less burden on the limited production base we have in the United States for atomic warheads in view of the large number of new warheads that we have under contract today.

General **Burke**. I have looked at that, Senator, and I wonder if I might ask you if we could talk about that a bit later.

Senator **Warner**. All right, we will go into closed session on that.

Any comment on the talk about the acceleration of the B-1 program, advancing IOC from 1986 to 1985?

General **Burke**. We think we can reasonably advance the IOC by a few months, but I do not think we will get it in 1985.

Senator **Warner**. Would that be additional cost?

General **Burke**. No, sir. Hopefully it would either reduce cost or add to our confidence that we were going to stay within the $20.5 billion. The quicker we get them built, the quicker we can get rid of the overhead.

Senator **Warner**. Why not put into the record the detail of the audit trail, the cost growth, for the ALCM program, and your views with respect to the degree to which such cost growth is attributable to the lack of a competitively available alternative to the Boeing ALCM?

General **Burke**. I will be happy to, sir.

[The information follows:]

COST GROWTH FOR ALCM

General **Burke**. The detail cost track on ALCM cost growth is as follows:

[Transition year—Dollars in millions]

	Total program
Fiscal year 1982 amended President's budget	$5,864.0
Fiscal year 1983 program changes impacting cost:	
1. Program increase of 930 missiles—	
(a) Procurement cost including inflation	+1,400.4
(b) Increased military construction for ALCM facilities at B-52H and B-1B bases	+79.7
(c) Increased support equipment	+275.4
(d) Increased RDT&E (Primarily due to B-52H and B-1 integration testing)	+85.0
2. Revised inflation estimates	+254.0
3. Revised production estimates	+113.4
Fiscal year 1983 President's budget	8,071.9

With respect to the lack of competition, the fiscal year 1982 Boeing airframe cost estimates were much higher than anticipated. The fiscal year 1980 and 1981 costs were based on contracts negotiated while Boeing was in competition with General Dynamics for a multibillion dollar ALCM program. Since cost was a big factor in the competition, the Air Force expected airframe costs for the fiscal year 1980-81 buys to be relatively low. Competition is not a factor in the fiscal year 1982 procurement effort; therefore, the Boeing fiscal year 1982 contract proposal is being worked in a "sole source" environment. Fact finding and negotiations on the fiscal year 1982 contract are currently in progress. The program office is considering various contracting strategies that will hopefully bring the fiscal year 1982 contract within the current funded level. A final contract is expected by late March or early April.

Senator WARNER. Yes; do you want to add something?

General BURKE. I think we failed to answer one of Senator Levin's questions, and that was the retrofit of the 18 of the first group of B-1B's. Yes, sir, we will do that. And yes, sir, that is included in the $20.5 billion.

Senator LEVIN. Thank you.

Senator WARNER. We are not specifically covering this subject in this hearing, but going back over the record of previous hearings with these same two witnesses I feel that we need further documentation relating to the ABRV decision.

Would you be able to provide us this morning with additional information concerning the choice of the Department of Defense of this warhead for the MX?

General BURKE. Yes, sir. Would you like me to do that now?

Senator WARNER. Yes.

General BURKE. The alternatives were the Mark 12A and the advanced ballistic re-entry vehicle. The Air Force had considered the Mark 12A as a baseline system. We had some discussions within the Pentagon in the last several months on that and they changed their mind and decided to go with the advanced ballistic re-entry vehicle.

The major argument that was made on the Mark 12A is, that it has a lower cost, particularly to the Department of the Air Force and the Department of Defense; that is less true when you factor in the Department of Energy cost.

Having it in production, we had very high confidence on its availability and so forth. But there are major and powerful arguments for the ABRV. It is, first, a more capable system, has a much better fuze and is more resistant to effects of adverse weather and nuclear effects as well.

It is a more efficient user of special materials and in that sense recovers much of the cost that the Department of Defense would spend. It is capable of delivering a larger yield than the Mark 12A, and that would provide a useful hedge against not achieving the accuracy objectives of the MX.

It has another generation of safety features which are desirable and would be useful.

Dr. Keel, would you like to add to that?

Dr. KEEL. No. I would just make one further statement, Mr. Chairman, and that is that there has never been disagreement within the Air Force analytical community with respect to the merit and desirability of going ahead with the ABRV. They have in fact unflinchingly supported that.

The only deliberations we had to factor in during budget considerations were funds. During the budget considerations with OSD, as you know, funds were made available to us. The requirement has always been there and we fully support it.

It gives you not only the opportunity to save special nuclear materials—as well as all the other features that General Burke has just delineated—but in addition for a given amount of nuclear material it gives you the opportunity to in fact extract higher yield. So, it does provide you that operational flexibility if needed, which is quite desirable from our standpoint.

General Burke. SAC had always favored the ABRV.

Senator Warner. But I want a specific answer to this question for our record, have the Air Force studies indicated there is an appreciable difference in the military effectiveness of the ABRV vis-a-vis Mark 12A?

General Burke. Yes, sir. As I stated previously the ABRV brings distinct advantages to the MX program. When we narrow our focus and consider the military effectiveness of the ABRV and Mark 12A, only in terms of destructive potential, at equivalent yield, our studies show results to be similar. However, the ABRV yield can be increased to compensate for such unforeseen events as a degradation in MX accuracy or increased Soviet target hardness. The Mark 12A cannot be upgraded in this manner.

Dr. Keel. That is correct.

Senator Warner. Dr. Keel?

Dr. Keel. I agree with General Burke's answers.

Senator Warner. Can the MK-12A Reentry Vehicle be modified to incorporate an integrated fuze and can the W 78 warhead be upgraded with insensitive high explosive (IHE)? What are the costs and schedule implications if such actions were to be taken?

Dr. Keel. The ABRV includes an integrated (path length) fuze. The cost of this feature is part of the $880 million (FY 1982$) ABRV cost delta to the MK-12A which was originally the MX baseline reentry vehicle. Incorporating an integrated fuze into the MK-12A would have added an additional $259 million (FY 1982$) to the baseline MX program. As for risks, arming and fuzing subsystem development is a major driver from the standpoint of schedule. We believe that ABRV, including its arming and fuzing subsystem, can be developed in time to meet a late 1986 IOC. While there has never been a program in being to add an improved fuze to the MK-12A, it is reasonable to expect that availability could be similar to that projected for ABRV.

As for the incorporation of IHE into the W 78 (MK-12A) warhead, this could be done, but certification of the modification would require an additional underground nuclear test. Costs to develop and produce either the W 78 (MK-12A) warhead) or the W 87 (ABRV warhead) are similar—around $800 million (FY 1982$). Of course we have been working to develop the W 87 warhead since early this year. Consequently, a decision to shift back to the W 78 warhead now would result on a schedule slip of from 6 to 9 months moving the MX IOC from later 1986 to at least mid 1987.

Senator Warner. In your personal opinion, should it prove possible to modify the Mark 12A along these lines, would the modified warhead have essentially the same capability from a military point of view as does the ABRV?

Dr. Keel. My answer to that is, no. First off, you cannot really put all the enhanced safety features into the Mark 12A, that is the first thing you must realize.

That aside, however, it does not have the potential for going to higher yield. You will still have that limitation with the Mark 12A.

The intent now with the warheads we will deploy, they have about the same yield, but with the ABRV warhead you have the potential of going to higher yield.

In addition, I might simply add that with respect to risk and schedule, and so forth, the biggest risk is with the warhead development itself. It is my understanding—and I will clarify this for the record—that there is no longer an opportunity to develop the Mark 12A warhead, produce it if you will, within DOE and still meet the MX IOC.

As you know, Congress has directed that we develop one warhead or the other, and we have made that decision. DOE is going along consistent with that.

Senator WARNER. Senator Levin, I would like to adjourn at 10:50 a.m. so that we can resume in executive session, over in room 407 precisely at 11 a.m.

Would you care to ask additional questions?

Senator LEVIN. Thank you. I can easily fit within that schedule too, Mr. Chairman.

Going back to those rotary launchers just for a moment, you have indicated that the procurement of those launchers for the B–1B is included in the B–1B program's baseline costs. What about the R. & D. on those launchers, is that included in the B–1B baseline cost?

Colonel EVATT. No, sir, the common strategic rotary launcher is being developed for all three, the B–1, the B–52, and the ATB. There is a separate, unique line for the development of that launcher.

Senator LEVIN. Do you know that the GAO feels that the portion of the R. & D. should be included in that baseline for the B–1B?

Colonel EVATT. No, sir. I have had no conversations with the GAO in reference to the common strategic rotary launcher.

Dr. KEEL. That is correct, Senator, GAO made no reference to the CSRL.

Senator LEVIN. Do you know what their position is on the simulators, whether or not they ought to be included, the B–1 simulators, in the B–1B baseline cost?

General BURKE. They said they should. There is no question as we discussed last year, that we are going to spend something in the order of $300 million for B–1B simulators, and that is a fair charge against the B–1B program. But in accordance with the way we manage programs, and the way we keep books on programs, we show it elsewhere.

Senator LEVIN. So, it is a fair charge against the program, but it is not included in the $20.5 billion figure.

General BURKE. Not included.

Senator LEVIN. All right.

I wonder, Mr. Chairman, if we might ask the GAO, on the launcher question whether or not they feel that it should be included in the baseline cost—the R. & D. portion attributable to the B–1.

Senator WARNER. If you will provide me with a letter, I will see that it is forwarded.

Senator LEVIN. Thank you.

And then, the other question, if we might ask the GAO whether or not they believe that the costs, all the costs of components needed to employ ALCM on the B-1B, are included in the $20.5 billion figure.

As I understand the Air Force answer this morning. It feels that all the costs, including the ones that I identified, are included. But I would appreciate it if the chair would also ask the GAO that question. I will submit that in the letter to the chair.

The other question I have relates to that full aircraft fuselage fatigue testing. I gather that since that has been completed that we will not be exercising our option for that additional B-1B for that purpose; is that a fair conclusion?

General BURKE. Yes, sir.

Senator LEVIN. Now, one item relative to the two-level maintenance concept for the B-1B. I understand we now are going to a three-level concept and any additional costs are included in the baseline figure. Is that because you do not believe there will be any additional costs connected with the three-level maintenance concept?

Dr. KEEL. Sir, we have made a decision to go to a what is called three-level organic maintenance concept, to the extent practicable. There is $1.8 billion in that $20.5 billion related to maintenance.

The Secretary of Defense, in making a decision with the Air Force to go three level, has indicated that we will in fact fund it from the $1.8 billion.

If there is interim contractor support needed as we bring on line that organic capability, that will properly be funded as is all interim contractor support, by the Air Force Logistics Command within their budget lines for that purpose.

Senator LEVIN. Well, is the short answer then, that there is no additional cost in your decision to go to the three-level concept as far as the B-1B program is concerned?

General BURKE. There is ample money in the B-1B program, in the $20.5 billion, to support the airplane.

Senator LEVIN. To fund that decision to go to that three-tier maintenance system?

General BURKE. Yes, sir. The fraction allocated to spares and support on the B-1B is 50 percent more than it was in the B-1A. We have, I think, been generous with that.

Senator LEVIN. My last minute will be taken up with the following question. It has to do with the penetration capability of the B-1B and the B-52H's.

Is it true that the B-52H's will be able to penetrate—without getting into the years because they are classified perhaps—but I am comparing now penetration capability.

Is it true that the B-52H's will be able to penetrate for at least 1 year after the B-1B's penetration ability begins to degrade?

General BURKE. No, sir, I do not think that is correct. I think the B-52H will do an excellent job today, as would the G. However, we see the Soviets in the process of beginning to deploy very large numbers of modern "look-down shoot-down" fighters of something approaching F-14, F-15 capability.

As they deploy these improved capabilities, the ability of those B-52's is going to decline pretty rapidly. I think we can say in an unclassified forum that by the late 1980's that the ability of the B-52's to penetrate will be questionable.

On the other hand, the B-1B is a very different airplane with an observability one one-hundredth of the B-52 and totally different; it has a 25 year more modern electronics countermeasure system.

We believe, based not only on analysis but actual test data against our own forces, it will be a highly successful penetrator well into the 1990's, and useful for many other things into the next century.

My own guess is that it will be a penetrator well beyond the mid-1990's. My personal view is that it will be effective into the next century. We rather consistently underestimated the longevity on the B-52G's, and H's, but now, I think, they are reaching the end.

Dr. KEEL. As you recall, sir, Director Casey of the CIA as well as Secretary Weinberger sent a letter back to Congress indicating that it is their mutual view that the B-1B will in fact penetrate well into the 1990's.

Senator LEVIN. In executive session I will refer to the charts of the Secretary of the Air Force, which have a different conclusion than you have just given. We will save that for the executive session.

Thank you, Mr. Chairman.

Senator WARNER. Additional questions have been submitted for the hearing record.

[The questions, with answers supplied, follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

JT3D ENGINES WITH THE KC-135 MODERNIZATION PROGRAM

Senator WARNER. General Burke, what is the Air Force's current plan with regard to using JT3D engines as part of the KC-135 modernization program?

ANSWER. JT3D engines will be used to reengine 18 special purpose C-135's and 24 Air National Guard KC-135's. The CFM56 package is the primary Air Force program for KC-135 modernization, which includes a new engine and improvements to 34 major systems or subsystems. The JT3D will be used as a replacement for a limited number of the present engines as an interim step to tanker modernization. It is not a substitute for the CFM56, and any funds allocated for the JT3D should not come at the expense of the CFM56 program.

ANG AND AFR KC-135 TANKERS

Senator WARNER. Would Air National Guard and Air Force Reserve KC-135 tankers be the first recipients of any such reengining?

ANSWER. The Air National Guard will receive the JT3D powered KC-135E's that were directed by Congress in the fiscal year 1982 Defense Appropriation. In a question and answer period before the Subcommittee on Preparedness (SASC) 26 February 1982, CINCSAC stated where these KC-135E aircraft would be assigned. The three locations to receive these aircraft are Phoenix-Sky Harbor International Airport, Arizona; Salt Lake City International Airport, Utah; and McGhee-Tyson Airport, Tennessee.

The Air Force Reserve (AFRES) KC-135's are not programmed to receive any JT3D powered aircraft (KC-135E). The three AFRES tanker units are all located on active force bases. To avoid two different types of tankers on the same base, AFRES plans to wait until both they and their collocated active units receive CFM56 powered KC-135R aircraft.

PROCUREMENT OF ADDITIONAL 12 KC-10 AIRCRAFT

Senator WARNER. To what degree would the procurement of an additional twelve KC-10 aircraft, over and above the 44 programmed in the present FYDP, and the cancellation altogether of the KC-135 reengining program represent a more advantageous approach to the tanker shortfall problem? Does your analysis support that of the Congressional Budget Office which indicates that such an alternative program could result in meeting 85-95 percent of the requirements that will exist through 1989 and save $5.7 billion over the next five years?

To what degree, if at all, would there be significant operational drawbacks to such a plan?

ANSWER. An additional 12 KC-10s, at the exclusion of the KC-135R, would not be a more advantageous solution to the total tanker shortfall. Air Force analyses support our conclusion that a modern tanker force mix of KC-135Rs and KC-10s is the most operationally sound approach to meeting our total needs.

Operationally, the AF views the total tanker refueling requirement to be approximately 25 percent higher than the CBO report. Additionally, the SIOP requirement is higher than the CBO estimate. In the aggregate, these refueling requirements are multi-faceted and must not be oversimplified.

When examining the range of solutions to the tanker shortfall, two things should be remembered. First, the KC-10 is a general purpose force projection asset, not a SIOP resource. The deployment and subsequent employment of large numbers of aircraft in a combat environment can require not only large amounts of inflight fuel transfer for each refueling event (e.g. "fuel-intensive"), but also can require a large number of tankers to perform multiple inflight refuelings and transfer smaller amounts of fuel to each receiver aircraft (e.g. "boom-intensive"). The Air Force must have the tanker capability to do both.

Second, the KC-10, as a force projection asset, will not only support the deployment of our general purpose aircraft, but will also serve as a cargo aircraft. This bonus capability will help alleviate our airlift deficiencies as identified in the Congressionally Mandated Mobility Study. Any attempt to dilute the KC-10s ability to maximize its potential, such as assigning the KC-10 to the Single Integrated Operational Plan (SIOP) as the CBO report suggests, would severly constrain our force projection capability.

The Administration's tanker program, which procures the initial 300 KC-135Rs and 44 KC-10s (option 1 in the CBO report) is an operationally sound, cost effective tanker force improvement. Over the long term, the Air force plans to reengine all KC-135As with the CFM56 engine to meet our operational needs. At this time the Air Force does not see any reason to change the fiscal year 1983 FYDP tanker program.

REPROGRAMMING FOR THE B-1 PROGRAM

Senator WARNER. Would you describe for the subcommittee the consequences—both contractual and programmatic—that would result from the failure on the part of the Congress to approve the reprogramming request submitted by the President for the B-1 program? Does the fact that you are moving the second production aircraft out of the fiscal year 1982 program and into the fiscal year 1984 program result in a change in the IOC for the B-1?

ANSWER. If the Congress does not approve the B-1B reprogramming request, there will be insufficient funds to accomplish RDT&E activities programmed for fiscal year 1982. Thus the work planned under existing Full-Scale Development (FSD) contracts will have to be reduced. This reduction in fiscal year 1982 RDT&E activities would require restructuring of the FSD contracts which, in turn, will require major adjustments to the current fixed price contracts and to the production schedule.

As a result, the B-1B IOC, now scheduled for September 1986, could slip six to nine months into 1987 and a total program cost increase of approximately $350 million (fiscal year 1981 dollars) could be incurred.

The proposed B-1B reprogramming would change the aircraft procurement schedule by deferring the procurement of one aircraft from fiscal year 1982 to fiscal year 1984. The aircraft delivery schedule will not be affected; therefore, the B-1B IOC of 1986 remains unchanged if the reprogramming request is approved.

IOC OF THE FIRST B-1B

Senator WARNER. Press accounts have attributed to Secretary Weinberger comments suggesting that a plan is being developed to accelerate the Initial Operational Capability of the first B-1B squadron from 1986 to late 1985. Would you address this issue and inform the Committee of the ways in which such acceleration could be achieved and at what cost?

ANSWER. The B-1B program certified by the President calls for a 1986 Initial Operational Capability. The Department of Defense is working toward that milestone. There is, given the appropriate funding and resources required, the possibility that the program could be accelerated. Around-the-clock operation, earlier build-up to rate production, etc., are examples of activities that could be studied for feasibility of implementation. However, there are no plans at present to accelerate the program any earlier under the currently structured $20.5 billion (fiscal year 1981 dollars) baseline program.

ABRV VIS-A-VIS THE MK-12A WARHEAD

Senator WARNER. Have Air Force studies indicated that there is an appreciable difference in the military effectiveness of the ABRV vis-a-vis the MK-12A warhead?

ANSWER. At equivalent yield, the military effectiveness of the MK-12A and the ABRV are judged to be similar. The ABRV warhead, however, can be increased in yield to [deleted] kilotons, providing a hedge against MX accuracy degradation or increased Soviet target hardness. The MK-12A warhead can attain a maximum yield of [deleted] kilotons.

CAPABILITY OF MODIFIED WARHEAD

Senator WARNER. In you personal opinion, should it prove possible to modify the MK-12A along these lines, would the modified warhead have essentially the same capability from a military point of view as does the ABRV?

ANSWER. The MK-12A can be modified to incorporate an improved fuze similar to that which is inherent to the ABRV design. Additional cost, if this were to be done, is estimate to be approximatley $259 million (fiscal year 1982 dollars). The MK-12A warhead (W 78) can also be configured with insensitive high explosive (IHE), but certification of the modification would require an additional underground nuclear test.

The yield of the MK-12A, however, cannot be increased above [deleted] kilotons. The ABRV warhead, W 87, can be increased to [deleted] kilotons, thus providing a hedge against MX accuracy degradation or increased Soviet target hardness.

UPGRADING OF THE U.S. STRATEGIC AIR DEFENSE CAPABILITY

Senator WARNER. What importance do you attach to the upgrading of the U.S. strategic air defense capability? As an element of our air-breathing strategic deterrent posture, should it receive resources on an equal footing with other strategic modernization efforts like the B-1, ATB and cruise missile program?

ANSWER. I place great importance on revitalizing our strategic air defense capability as an essential element of the strategic modernization program announced by President Reagan last October. Given the capabilities of the present and projected Soviet bomber threat in comparison to our existing air surveillance and warning system, the assured survivability of U.S. strategic bomber and tanker forces and the National command authorities is at risk. While our strategic offense modernization is considered our highest force priority, we must also continue the phased upgrade of NORAD air defenses to ensure the continued viability of our overall strategic posture.

VULNERABILITY OF THE UNITED STATES

Senator WARNER. How great do you regard the vulnerability of the United States to a precursor Soviet bomber-delivered attack to be? Is it conceivable, in your view, that the Soviet Union could confidently anticipate being able to conduct such an attack without detection?

ANSWER. The current North American atmospheric surveillance system has serious deficiencies. It is possible that a well-planned attack by a small number of Soviet bombers could [deleted]. Additionally, the element of surprise is a fundamental tenet of Soviet tactics and has been demonstrated as recently as the Afghanistan invasion. Therefore, it is prudent for the U.S. to assure that any bomber attack would be detected by upgrading the DEW Line and deploying over-the-horizon backscatter (OTH-B) radars to cover the air approaches to North America.

STRATEGIC AIR DEFENSE ASSETS

Senator WARNER. Under the current plan, would strategic air defense assets—F-15's and E-3As—be available for non-strategic missions in the event a conventional war should develop, or would these weapons be held totally in reserve in event of a Soviet strategic bomber attack?

ANSWER. Strategic defense F-15's and E-3A's are being procured to bolster our air defense capability, especially for use during periods of increased tension or wartime conflict. The F-15's will be dedicated to the air defense mission as are the F-106s they will replace. The E-3A's will be integrated with the total AWACS f[illegible], and thus available for worldwide deployment. Should contingencies arise, both the F-15 and E-3A are inherently capable of being employed in other theaters.

NECESSITY FOR EXPENDING $2.7 BILLION FOR B-1 R&D

Senator WARNER. Would you describe the necessity for expending some $2.7 billion over the life of the B-1 program in continued research and development? Some have raised questions that the number has grown substantially since the original B-1 program was terminated. What aspects of the B-1B require such further R&D and, in your personal view, how essential are those aspects to the B-1's ability to perform the desired mission through the coming decade?

ANSWER. The B-1B production schedule, and therefore program cost, is contingent upon an aggressive front-end RDT&E effort. The B-1B RDT&E program of $2.5 billion (fiscal year 1981$) can be divided into three general categories of activity: (1) RDT&E activities deferred and/or incomplete in 1977 at the time of B-1A production/deployment termination—$900M; (2) RDT&E efforts necessary to incorporate producibility/cost redesigns which will reduce program and operating costs—$900M; and, (3) RDT&E activities required to incorporate the multi-role capabilities in accordance with Congressional direction (FY 1981 Defense Authorization Act)—$700M.

The RDT&E program represents work which is crucial to the timely and cost-effective transition from systems development and integration into production. Any reductions or delays in the scope of the B-1B development effort would seriously delay the production schedule, and result in increased program costs and risk.

In sum, we are committed to producing a multi-role B-1B bomber which will be capable of defeating current as well as future Soviet threats through the full spectrum of conflict. Moreover, we are dedicated to producing this system in the most cost-effective manner to meet the required need date. To accomplish these objectives, funding the B-1B RDT&E program at the requested levels is essential.

RADAR CROSS-SECTION REDUCTION MEASURES

Senator WARNER. Specifically, do you believe that it would be prudent to defer the incorporation of, among other things, radar cross-section reduction measures into the B-1B? Do you believe that doing so would represent, to some degree at least, a breaking of faith with the Congress by departing from the design that was presented to it and approved by it in 1981?

ANSWER. It would n[illegible] prudent to deviate from the Congressionally approved B-1B baseline configuration/design at this stage of program development. To a large degree the baseline B-1B configuration has been integrated into the planning, design, specifications and contracts; therefore, deferring major features, such as radar cross section (RCS) reductions, would have a potential negative impact on the program schedule and cost.

RCS reductions, for example, are incorporated into various sections of the airframe and major subsystems. Deferral of RCS reduction measures would require many of the design drawings and specifications to be reaccomplished, thus negating much of the work/money already expended for these efforts.

Moreover, due to the interdependencies of the baseline features, changes in one may impact the design or integration of others. If RCS reductions were to be deferred, for example, maintaining the same confidence in the B-1B's penetration capabilities could require that power/specifications of the B-1B's electronic countermeasures equipment be changed.

In sum, at this critical juncture in the B-1B program we feel that any deviation (addition or deletion) from the Congressionally approved B-1B baseline configuration would adversely affect the program.

"SUBSTANTIAL" ADDITION TO THE CRUISE MISSILE PROGRAM

Senator WARNER. Secretary Weinberger has been reported to say that there will be a "substantial" addition to the cruise missile program. Are you aware of plans to increase the Boeing air-launched cruise missile program beyond the levels previously announced by President Reagan?

ANSWER. The Administration stated that we will deploy more than 3,000 cruise missiles. The Air Force is presently evaluating how many cruise missiles will be required based upon our strategy and the forecast threat.

SURVIVABILITY OF ALCM

Senator **Warner**. What steps are being taken to improve the survivability of the air-launched cruise missile in its present configuration?

Answer. As a hedge against any future enemy threat, the Air Force has initiated an Electronic Countermeasure (ECM) protection program to enhance the survivability of the current AGM-86B ALCM. The program is funded, with production to begin in fiscal year 1983 and actual retrofit to start in fiscal year 1984.

THREAT FROM SOVIET AIR DEFENSES TO ALCM

Senator **Warner**. How acute do you regard the threat from Soviet air defenses to be to the current ALCM and to what point do you believe it will be imperative that an additional capability be added to the ALCM to insure its survivability?

Answer. The Soviets presently have in being, or near operational status, the essential elements needed to eventually establish a credible defense against targets, such as ALCM, which rely on the attributes of low-altitude flight and low radar cross section to aid their penetrativity. These elements include the [deleted]. The latter system is estimated to be operational in the former [deleted]. Current deployment-rate estimates for these systems indicate the Soviets will have established a [deleted]. Assuming these deployment rates remain valid throughout the period, enhancements to the present ALCM, [deleted] will be required during the late 1980's to ensure its continued effectiveness across the entire target base.

INTERIM SILO-BASING OF THE MX MISSILE

Senator **Warner**. What, in your personal opinions, would be the impact on the strategic balance, crisis stability, arms control negotiating policy, and the credibility of the U.S. nuclear deterrent of a decision by the Congress not to proceed with interim silo-basing of the MX missile as requested by President Reagan?

Answer. I believe the near-term deployment of the MX missile in silos is an important indicator of U.S. resolve to meet the Soviet strategic challenge and that it will enhance our overall nuclear deterrent. MX will provide sorely needed prompt hard target kill capability to offset the virtual Soviet monopoly in this area. Further, I believe that the most critical component of crisis stability is the Soviet perception of the U.S.'s will and capability to take whatever actions are required; near-term deployment of MX will improve both the perception and fact of U.S. capability. With respect to arms control negotiations, the highest form of leverage is provided by the active production and deployment of an extremely effective weapon system. MX will begin to prove its effectiveness within a year as it begins flight testing; however, only by actually planning to deploy and then deploying the system as soon as possible can this potential capability leverage be brought to bear. The possibility that the limited MX silo deployment could be rapidly expanded if necessary, enhances the arms control leverage provided by near-term silo deployment.

In summary, I believe the near-term silo deployment of MX is a vitally important aspect of the President's comprehensive program to improve our strategic capability. It most definitely will have a positive impact on U.S. national security.

LONG-TERM BASING MODE FOR MX

Senator **Warner**. If the Air Force were to be directed to develop a survivable, long-term basing mode for MX utilizing only one of the defended, deceptive basing schemes under consideration, how long do you believe it would take for such a proposal to be put forward? Could it be done, if additional funds were made available, by January, 1983?

Answer. The Air Force has already been directed to put forward a single defended, deceptive basing concept for MX. This concept will be evaluated against deep basing and ballistic missile defense of fixed silos prior to July 1983. The results of this evaluation will determine which concept or concepts should be continued to full scale development and deployment.

In that sense, we plan to narrow defended deceptive basing candidate concepts down to a handful by August 1982 and to the best concept by Spring 1983. We may be able to identify the most promising defended deceptive basing concept by January 1983, but some technical risk would be associated with the schedule acceleration.

CONTINUOUS PATROL AIRCRAFT AND DEEP UNDERGROUND BASING

Senator Warner. How much additional funding do you believe would be required to meet the earliest possible decision date if the Air Force were relieved of the requirement to study intensively the Continuous Patrol Aircraft and Deep Underground basing?

Answer. We could accelerate the Defended Deceptive Basing (DDB) schedule, however, this would be at additional technical risk. We could shorten the concept definition phase by perhaps a few months using the funds earmarked for CPA and DB in fiscal year 1982.

If we were directed to go into engineering development for defended deceptive basing in early 1983, we would undoubtedly need more than the amounts identified for long-term basing in fiscal year 1983. These additional funds would be used to begin prototype development, technology and constructability demonstration tests, detailed siting characterization, and defense integration.

DEVELOPMENT OF ABRV WARHEADS

Senator Warner. Insofar as the Department of Defense has awarded a contract for the development of ABRV warheads, what would be the impact of a decision by the Congress in the June 1982 timeframe to restrict warhead development funds to the MK-12A system? Would contract termination liability to AVCO be incurred? At what level?

Would there be an impact as a result of this decision on the MX IOC?

Answer. From an Air Force standpoint, switching back to the MK-12A would result in no schedule impact. Maximum liability on the AVCO contract is $24 million.

The Department of Energy would have a more difficult problem because they believe that changing to the W 78 (MK-12A) warhead would result in an MX IOC slip. For example, from DOE's perspective a decision in June of this year could add another 6-9 months to the program, moving the MX IOC from late 1986 to mid 1987. [Deleted.]

Should you desire more definitive estimates and rationale, I am sure that the Department of Energy would be glad to provide them.

DEGRADATION IN THE MX ACCURACY

Senator Warner. In your personal professional judgement is the bottom-line on the question of whether or not to proceed with the ABRV one of obtaining a hedge against some degradation in the MX accuracy by buying a warhead with a capability to increase its yield to [deleted] kilotons and, should that accuracy prove to be as good as is presently predicted, realizing significant savings in special nuclear materials? How important to you is the maintenance of such a hedge, and is it worth the additional costs projected for this program?

Answer. Obtaining an increased yield hedge, while important, is only one of the reasons why a decision was made to incorporate ABRV into the MX program, other reasons were:

(1) ABRV is an advanced technology reentry vehicle with improved accuracy, enhanced all weather capability and increased hardness against nuclear effects.

(2) The ABRV warhead will incorporate modern safety features which will reduce even further the already very small chances of a nuclear accident. Some modification of the W78 (MK-12A warhead) would have been required to incorporate these features. Additional underground nuclear testing would have been required to establish the feasibility of this modification.

(3) The ABRV will use significantly less nuclear materials than the MK-12A at equivalent yield. These savings, combined with the cost that would have been required to upgrade the MK-12A fuze, produce offsets that tend to balance out cost to the government of shifting to ABRV.

(4) The ABRV provides an important element of diversity and advanced capability in the MIRVd ICBM force.

(5) And, finally, the ABRV can be developed and procured in time to meet a late 1986 MX IOC with acceptable schedule risks.

SUBSTANTIAL COST GROWTH IN THE B-1 PROGRAM

Senator Warner. Would you discuss with the Committee reports that have been circulating in recent weeks about a substantial cost growth that has already appeared in the B-1 program?

Answer. There have been no cost growths in the B-1B program. The Department of Defense remains firmly committed to delivering the B-1B program on time and within the $20.5 billion (fiscal year 1981 dollars) and we have established rigorous management procedures to tightly control the schedule and cost of this vital strategic program. Our ability to manage the program within the $20.5 billion budget is dependent upon continuing Congressional support of the B-1B budget requests to keep this very essential program on schedule and within cost.

DEVELOPING THE BASELINE FOR THE B-1B PROGRAM

Senator **Warner**. Has the Cost Analysis Improvement Group identified significant increases in cost of the B-1 as a result of errors or shortcomings in the accounting methodology used in developing the baseline $20.5 billion for the B-1B program? Did the CAIG differ with the Air Force estimates of savings to be realized in the learning curve and multiyear procurement areas? Was the CAIG critical of elements of the program that were not included as part of the research and development and acquisition costs?

Answer. The Cost Analysis Improvement Group [CAIG] has not performed an analysis of the B-1B cost estimate. The chairman of the CAIG, Mr. Margolis, performed a cursory check of a draft General Accounting Office (GAO) report last fall and submitted a "preliminary" evaluation in a memorandum to the Deputy Secretary of Defense on November 1, 1981. The Deputy Secretary of Defense's memorandum of November 4, 1981, on the B-1B program outlines the baseline program and the management controls to be implemented to ensure the program is accomplished within the $20.5B (fiscal year 1981 dollars) budget. The President has certified the $20.5B program to the Congress in a January 18, 1982, letter. Given the necessary funding support in Congress, the B-1B program cost and schedule will be met.

GAO'S REVIEW OF COSTS OF B-1 PROGRAM

Senator **Warner**. What is the status of the General Accounting Office's review of the costs of the B-1 program and is there a question as to whether or not they will have access to the CAIG analysis?

Answer. The General Accounting Office (GAO) prepared a draft statement on the B-1B program which was circulated last year. Mr. Margolis, Chairman of the Cost Analysis Improvement Group (CAIG), performed a cursory "preliminary" evaluation of that draft statement last fall. However, the CAIG has not performed an analysis of the B-1B program and neither the CAIG nor GAO has submitted an official/formal report on the B-1B program.

As a matter of policy, the Air Force does not formally comment on unofficial, draft statements.

AERIAL TANKER FORCE MODERNIZATION PROGRAM

Senator **Warner**. Have you had an opportunity to review the report recently issued by the Congressional Budget Office concerning the Aerial Tanker Force Modernization Program? Would you comment on and give a reaction to it and its findings?

Answer. We have reviewed the report. The Air Force sees a differing requirement for tanker capability. In our opinion, the CBO requirements for air refueling are unrealistically low. The report basically dismisses the European scenario, understates Persian Gulf demands, incorrectly assumes the refueling needs of "standoff" cruise missile carrying B-52 as well as the bomber force structure itself, and does not consider the growth in general purpose force levels.

Air Force requirements are based on detailed analysis of the Department of Defense planning documents which direct the thrust of our overall force size, its likely employment, and in turn, AF tanker requirements. The results of the CBO report are confounded primarily because there is no consistent baseline of tanker capability. A more accurate analysis is possible by considering equal capability tanker forces and varying the mix of tankers that make up that force. Furthermore, the investment cost is not the sole determinant in such a far reaching decision as the AF has made on long-term tanker capability, requirements, and investment.

The Air Force has consistently used investment and the cost of owning and operating any tanker force in determining the necessary tanker investment strategy. Our analyses support the AF position that the tanker force mix of 300 KC-135Rs and 60 KC-10s as the most effective force at the lowest cost for the added tanker capability. We shall have more comments once we conduct further study of the CBO report.

NEAR-TERM SHORTFALLS IN TANKER REQUIREMENTS

Senator **Warner**. Do you agree with CBO in its assessment that the Administration's program will fail to redress near-term shortfalls in tanker requirements and will provide excess capacity in the outyears?

Answer. No, Senator, we do not agree. Only the judicious application of the available tanker force can help our near-term shortfalls. No tanker force will solve the near term problem simply because we did not start on tanker modernization early enough. This is because of fiscal constraints in previous years. Each of the tanker forces contained in the CBO's assessment have approximately equal capability in the mid-80s. From that point, their capability diverges.

The administration's tanker modernization program will meet the more prudent validated AF outyear tanker requirements. More importantly, this force is the only one which provides that additional capability.

The CBO's conclusion of excess capability in the outyears is based on an unrealistically low requirement. The AF program to start a measured tanker capability improvement now will allow outyear flexibility to tailor the tanker force size and composition to meet the demand.

In sum, there is nothing in the CBO report to cause us to change the Administration's tanker program in the fiscal year 1983 FYDP.

TANKER REQUIREMENTS

Senator **Warner**. Do you agree with CBO's characterization of tanker requirements peaking in the late 1980's and then dropping off dramatically in the mid-1990's?

Answer. No, we do not. The Air Force does forecast a peak tanker demand in the mid-to-late 1980's but there is not a dramatic decline in the mid-1990's. The requirement is higher than CBO's, on the order of 1000 KC-135A tanker equivalents, in the early 1990's and is a relatively steady state demand thereafter.

KC-135'S IN INVENTORY

Senator **Warner**. Last year you testified that the KC-135's were going to be structurally sound and, consequently, could be in the inventory past the year 2025. In view of the sunk investment in these tanker assets and their prospective utility for years to come, isn't it only sensible to maximize the capability represented by those airframes.

To what degree do life-cycle cost considerations support the decision to maximize the sunk investment through the CFM56 program?

Answer. Life-cycle cost considerations were a key factor in the selection of the CFM56 engine to modernize the KC-135. A range of options was examined, including new aircraft procurement. The most cost effective approach, in terms of life-cycle costs, was to reengine the structurally sound airframe with a modern, fuel-efficient engine while upgrading 34 essential systems and subsystems to match airframe and engine service life. The KC-135/CFM56 will realize fuel savings of 25 percent compared to the present engine. Annual fuel savings if the entire fleet were reengined would exceed 110,000,000 gallons per year. The reengined KC-135 would also provide a 50 percent improvement in operational capability, in the aggregate. The combination of increased capability, significant fuel savings, and upgraded systems make the KC-135/CFM56 the most cost effective approach to tanker modernization, based on life-cycle costs.

RETIREMENT OF OLDER NUCLEAR SYSTEMS

Senator **Warner**. As you know, there has been much interest in those aspects of Reagan strategic forces modernization program that call for a retirement of older nuclear systems. Would you give us your thoughts as to the marginal value added to our strategic forces by the B-52D aircraft and the principal factors that, in your personal, professional judgment, justify the retirement of those systems at this time?

Answer. We are continuing to operate some B-52D's until the B-1B becomes available in fiscal year 1986; thereby retaining a major portion of their contribution to the strategic forces. Maintaining all five squadrons would be less-than-efficient use of the money. By retiring three squadrons in fiscal year 1983, we can free $1.2 billion, 84 tankers, and several hundred trained people for more cost effective programs.

O. & M. COSTS TO RETAIN THE B-52D'S

Senator **Warner**. Should we elect to retain the B-52D's in the inventory for several more years, what would the O&M costs be? What would the incremental additional tanker requirement to support these aircraft be? What would the cost of acquiring such additional tanker capability be?

Answer. The O&M costs to retain the current force structure of B-52D's is approximately $259 million per year in constant fiscal year 1984 dollars. These costs are only for operations and maintenance and do not account for additional expenditures required for aircraft modifications, personnel pay, or required spare parts to support employment of this force.

Currently, the KC-135 tanker assets are inadequate to support a fully generated bomber force which requires [deleted] tankers. The current B-52D force structure requires [deleted] tankers to support it, but it has only about [deleted] assigned to it. Holding these tankers to B-52D support further increases an existing overall tanker shortfall resulting from growth in the general purpose refueling requirements and introduction of the Air Launched Cruise Missile (ALCM) on the B-52's. This refueling requirement growth more than offsets any temporary refueling requirement decline due to B-52D phaseout. Removal of the B-52D only lessens the degree of tanker shortfall in the near term. The solution to the total tanker shortfall lies in increasing existing tanker capability. The Air Force program to procure 60 KC-10's at a cost of $4.4 billion and to reengine 300 KC-135's at a cost of $6.8 billion will help alleviate the refueling shortfall.

ADDITIONAL STEPS TO RETAIN BOMBERS

Senator **Warner**. If the decision were made to retain these bombers in the inventory, what additional steps do you believe would be required to insure that they retain some credible strategic war-fighting capability?

Answer. To retain the B-52D as a realistic strategic deterrent we would have to conduct an extensive modification program to upgrade its capabilities. As a result of last year's funding and the imminent phase-out of at least a portion of the B-52D fleet, the modification program was greatly restricted. This program would have to be revised to include a complete upgrade of its electronic counter measures suite, reinitiation and completion of the Digital Bomb Nav System, engine reliability improvements and continuation of the depot maintenance/modification program. In addition, complete funding of the necessary replenishment spares, stock fund, and service engineering requirements would be required.

COST OF MAINTAINING KC-135

Senator **Warner**. What costs have been identified as being necessary to insure the continued safety and usefulness of the KC-135 aircraft in the event a decision should be made not to proceed with reengining? Of course, it goes without saying, that any such costs would be expended without achieving any appreciable improvement in the capability of the KC-135's to perform their refueling missions.

Answer. To date, the prime consideration for continued safe operation of the KC-135A if a decision is made not to reengine the aircraft is to replace numerous components within the J57 engines.

Currently the Air Force is funding the start of a modest J57 engine reconditioning program which will replace only critical safety related components to prevent catastrophic failures. If a decision were made not to proceed with CFM56 reengining, the cost of this modest reconditioning program would be approximately $364M (transition year dollars) to recondition the current inventory of J57 engines. To insure completely reliable J57 engines, a more comprehensive component replacement program would be required. This program would replace not only safety related components, but other parts that would bring the J57 engines back to their original specifications. The estimated cost of this program, Pacer Grade, is $1,533M fiscal year 1981 dollars and would recondition the current inventory of J57 engines used on the KC-135 force.

CONDITION OF MINUTEMAN II'S AND III'S

Senator **Warner**. Would you provide for the Committee an assessment of the condition of the Minuteman II and Minuteman III missile systems? Is it not the case that a growing number of problems have been identified with these systems and that a program designated RIVET MILE has been developed starting with the fiscal year 1984 budget, to begin necessary improvements to the Minuteman II's and III's?

What is the magnitude of the RIVET MILE program and how quickly do you anticipate it will be able to redress identified and suspected problems?

Answer. The Minuteman II and III are reliable and effective weapon systems. This conclusion is constantly reaffirmed by our operational testing and assessment programs. However, Minuteman II and III are older systems which are experiencing the common difficulties associated with out-of-production weapon systems. As a point of interest the Minuteman had a design life of three years and a design goal of 10 years. The Minuteman is fully capable now and should continue to be an effective weapon system through the year 2000, if not indefinitely. Our continuing task is to correct normal aging problems as identified by our assessment programs. Presently we are working programs which include logistics supportability of the Minuteman II guidance set and propulsion initiatives to correct aging problems associated with Minuteman III Stage II and III motors and Minuteman II Stage III. RIVET MILE, Minuteman Integrated Life Extension, is another initiative to extend the life of Minuteman by providing an integrated logistics program which efficiently performs depot maintenance and modifications and provides for the continuing provisioning of spares and support equipment. We are convinced that it is absolutely necessary to establish a periodic depot maintenance program for the weapon system since no major force upgrades are planned for Minuteman. In the past as the Minuteman went through major force upgrades, we performed depot maintenance, but now on-site depot maintenance will be minimal to nonexistent without a new approach to managing Minuteman logistics requirements. We are in the process of engineering and defining RIVET MILE; however, that program as presently structured leads us to believe we can perform RIVET MILE for approximately $100 to $150K per facility. RIVET MILE is presently competing for resources within our fiscal year 1984 Program Objective Memorandum and is not, as yet, an approved Air Force program. Current plans start RIVET MILE during fiscal year 1984 or 1985 and continue indefinitely, probably on a 3-year cycle.

COST GROWTH TO BOEING ALCM

Senator **Warner.** To what degree do you believe such cost growth is attributable to the lack of a competitively-available alternative to the Boeing ALCM? Is consideration being given to a leader-follower production of these missiles?

Answer. The fiscal year 1982 Boeing airframe cost estimates were much higher than anticipated. The fiscal year 1980–81 costs were based on contracts negotiated while Boeing was in competition with General Dynamics for a multi-billion dollar ALCM program. Since cost was a big factor in the competition, the Air Force expected airframe costs for the fiscal year 1980–81 buys to be relatively low. Competition is not a factor in the fiscal year 1982 procurement effort; therefore, the Boeing fiscal year 1982 contract proposal is being worked in a "sole source" environment. Fact finding and negotiations on the fiscal year 1982 contract are currently in progress. The program office is considering various contracting strategies that will hopefully bring the fiscal year 1982 contract within the current funded level. A final contract is expected by late March or early April.

A leader-follower option was considered for the current ALCM. In the 30 April 1980 Secretary of Defense Decision Memorandum for the ALCM (DSARC III) the SecDef decided that a leader-follower option was not necessary because we have established two production sources for the engine, the guidance system and a significant portion of the missile airframe. This provides the necessary competitive environment in the major subsystems which comprise more than two-thirds of the missile's cost. The Air Force is pursuing an improved ALCM option beginning in fiscal year 1984. Should the decision be made to proceed with an improved ALCM, competition will be introduced with strong consideration for a leader-follower option.

ONE CONTRACTOR FOR ALCM

Senator **Warner.** Do you believe the U.S. is ill-served by having only one contractor involved in the Air Launched Cruise Missile production?

Answer. The ALCM contractor (Boeing Aerospace Company) has put together a strong management-engineering team that has served us well in terms of developing a quality product. They have embarked on an ambitious production effort using several manufacturing technological advances that support deployment of a major weapon system.

However, the fiscal year 1982 Boeing airframe cost estimates were much higher than anticipated. As noted above, the program office is attempting to negotiate a contract which will fall within the current funded level, with a final contract expected by late March or early April.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

PENETRATION CAPABILITY OF B-52

Senator THURMOND. General Burke, the degradation of penetration capability of the B-52 underscores the need for the B-1 for deep penetration purposes. In your estimate, when will the B-52 cease to be capable of penetrating Soviet air defenses?

ANSWER. The B-52 will continue to perform a penetration role into the mid to late 1980's. Its ability to penetrate is enhanced because of our diversification of strategic systems. By deploying the Air Launched Cruise Missile and the B-1B, we compound the Soviet defense problem. When the B-1B becomes operational in 1986, it will assume the more demanding penetration missions and the B-52 will perform the shallow, less demanding penetration mission as well as the standoff cruise missile sorties.

Maintaining the B-52 in the penetration role is due to necessity, not choice. It is not a suitable penetrator because of its large radar cross section, slow speed, and poor base escape capability. This makes it highly vulnerable to Soviet airborne and ground-based defenses.

SUFFICIENT NUMBER OF B-1'S

Senator THURMOND. Will the United States have enough B-1's at that time to sufficiently destroy these deep targets?

ANSWER. The overall modernization of our strategic TRIAD including the number of B-1B's in our modernization program was based upon our projected requirements as a result of the forecast threat.

DELAY OF THE B-1 PROGRAM

Senator THURMOND. If the B-1 program is delayed for any reason, what effect will it have on our ability to destroy these targets?

ANSWER. The time-phased modernization plan for our strategic bomber forces calls for a mixed force of B-52s and B-1Bs in the latter portion of this decade. This plan allows for the B-52s to transition from penetration to a shoot-and-penetrate, and eventually to the less stressful pure stand-off delivery role as their penetration capability declines during the second half of the 1980s. During this same period, the B-1B with its reduced radar cross-section, higher speed at low altitude, and advanced electronic countermeasures will replace the B-52s in the manned bomber penetration role.

Delays in the B-1B program will result in the B-52s becoming increasingly vulnerable to projected Soviet air defenses which, in turn, will result in decreased target destruction probability of heavily defended targets.

IOC OF ADVANCED TECHNOLOGY BOMBER

Senator THURMOND. If the Advanced Technology Bomber does not make its IOC as the B-1B's penetration capability lessens, will we still be able to assure destruction of these targets?

ANSWER. The B-1B is projected to be able to penetrate the anticipated Soviet air defenses well into the 1990's. The Advanced Technology Bomber (ATB) is projected to have an Initial Operational Capability (IOC) in the early 1990's. Thus there is significant cushion between the two programs' penetrator role responsibilities.

If complications in the ATB development cause extended delays in its IOC, options will be explored to increase the total buy of B-1Bs, to investigate possible modifications with new penetration and electronics that will doubtlessly emerge during this decade, and to continue investments in improved ALCM systems that are in early development stages today. These options provide good insurance for our ability to destroy heavily defended targets even in the robust defense environment projected for the 1990's. The prudently paced ATB development program also is good insurance against a lengthy delay in its deployment.

FB-111/DEGRADATION OF PENETRATION CAPABILITY

Senator THURMOND. General Burke, the FB-111 is a fine, all-weather bomber. Will it suffer the same degradation of penetration capability as that projected for the B-1?

ANSWER. The continued effective performance of the FB-111 aircraft within the future operational environment relies upon its defensive systems having the ability to successfully counter the evolving threats. The FB-111 will suffer a degradation of penetration capability slightly earlier than that projected for the B-1B because the B-1B has a smaller radar cross-section and more sophisticated electronic countermeasure systems.

ALCM OPERATIONALLY TESTED

Senator THURMOND. Dr. Keel, has the Air Launched Cruise Missile been operationally tested at the range of temperatures that are to be experienced during a B-52 flight?

ANSWER. Yes, the ALCM has been tested with the B-52 in both the captive carry and live launch modes at all B-52 flight regimes. Altitude ranged from 700-40,000 feet where the temperatures variation experienced was plus 125 to minus 65 degrees Fahrenheit.

RESULTS OF ALCM TESTS

Senator THURMOND. What were the results of those tests?

ANSWER. To date 27 launches of the AGM-86B have occurred with 19 successes, 1 partial success and 7 failures. Ten missions were flown during the competition flyoff (July 1979-Februrary 1980) and 17 during the on-going Development/Follow-on Operational Test and Evaluation phase (June 1980-September 1982). None of the failures were temperature related.

QUESTION SUBMITTED BY SENATOR J. JAMES EXON

COST OF INCREASING THE B-52 ALERT RATE

Senator EXON. What would be the cost of increasing the B-52 alert rate from 30 to 40 percent in fiscal year 1983? The out years? (Please include a break-out of all associated costs.)

ANSWER. Increasing the B-52 daily alert rate results in significant increases in aircrews, flying hours, maintenance support, facilities, logistics and air refueling requirements. The nominal lead time to acquire the necessary personnel, aircraft spares, and military construction is two years. Assuming initiation of the increased alert in fiscal year 1983 a 40 percent rate would be reached in fiscal year 1985. The following costs are a quantified appraisal of aggregate requirements and costs. In-depth analysis would be necessary to adequately cover personnel availability, aircraft availability during ALCM conversion, and aircrew/technical training systems capability.

	Millions
Fiscal year 1983 initial costs:	
Aircraft procurement	$6.9
Military construction	25.0
Operations and maintenance	40.8
Personnel	15.0
Total	87.7
Overall alert costs fiscal years 1984-87:	
Aircraft procurement	163.8
Military construction	50.0
Operations and maintenance	829.9
Personnel	330.2
Total	1,373.9

However, the present 30 percent daily alert rate can surge to 50 percent in [deleted] hours and 100 percent in [deleted] hours. These surge rates can be maintained for [deleted] and [deleted] respectively without additional funding being required.

QUESTIONS SUBMITTED BY SENATOR CARL LEVIN

MX VERSUS D-5

Senator LEVIN. General Burke, how much less costly is the MX than the D-5 as an alternative for the CPA?

ANSWER. Since we have been restricted from spending funds on CPA we are not currently studying this basing mode. Therefore, we are not currently doing tradeoff studies regarding the CPA alternative. And prior to the funding restriction we had not previously studied the option of using the D-5 on CPA.

TOTAL COST ATTRIBUTABLE TO B-1B

Senator LEVIN. If we accept the baseline B-1B costs as $20.5 billion, what are the total costs attributable to the B-1B in all other program elements that would be considered as a "fair charge to the B-1B program"? Why is there no Military Construction funding associated with the B-1B program element?

ANSWER. The $20.5 billion (fiscal year 1981 dollars) B-1B baseline acquisition program includes the RDT&E, procurement, and initial spares required for the acquisition of 100 B-1Bs (with internal and external cruise missile carriage).

There are other charges outside the $20.5 billion (fiscal year 1981 dollars) baseline acquisition program—as is normally the case for aircraft programs—such as technology modification initiatives, production facility improvements, and engine component improvement programs. These items are under separate Program Elements (PE's) because they have potential application/benefit to a variety of other programs both present and future.

In addition, there are items related to the B-1B which are outside the B-1B acquisition program (e.g., operations and support costs). These items are more appropriately included as part of the system's life cycle costs rather than acquisition costs.

There is currently no military construction funding associated with the B-1B program because such funding is totally contingent upon the bases selected for B-1B deployment. It is anticipated that the basing decision for the B-1B will be announced in January 1983. The first increment of B-1B associated military construction funding will be in the President's fiscal year 1984 budget.

OSD CAIG ESTIMATE

Senator LEVIN. What was the OSD CAIG estimate for the B-1B?

ANSWER. The OSD Cost Analysis Improvement Group (CAIG) has not submitted an official/formal cost estimate of the B-1B acquisition program.

DEPLOYMENT OF MX MISSILES

Senator LEVIN. Based on our best intelligence estimates about the effectiveness of Soviet ICBM's by the time we deploy MX missiles in the interim basing mode—Minuteman silos—what number of MX missiles would be expected to survive a Soviet surprise attack if they were not launched on warning? What number of MX warheads, and with what EMT would be expected to survive? If MX was not deployed in 40 MM silos, how many MM missile warheads and EMT in these silos would survive under these conditions?

ANSWER. In a 1987 ICBM force of 40 MX and 960 Minuteman, [deleted] missiles in silos would be expected to survive a Soviet two-on-one surprise attack. Using the lesser figure, the surviving [deleted] would have [deleted] equivalent megatons. Of the 960 Minuteman ICBMs, about [deleted] would be expected to survive, resulting in approximately [deleted] equivalent megatons.

In an ICBM force of 1000 Minuteman and no MX, about [deleted] missiles with [deleted] would survive the same attack. This is approximately [deleted] equivalent megatons.

Thus, with MX the total is about [deleted] and without MX the total is about [deleted].

Senator LEVIN. For this same period, what number of B-52Ds, with what number of weapons and EMT, would be expected to survive, if all five squadrons remain deployed until the B-1B IOC and if the normal day-to-day alert percentage was maintained and the aircraft launched on warning of a suprise Soviet first strike?

ANSWER. There would be [deleted] B-52D aircraft assumed on alert given that four CONUS squadrons of B-52Ds would be available for day-to-day alert during the B-1B IOC timeframe. These [deleted] aircraft would represent [deleted] potential weapons having an EMT potential of [deleted] MTs. The probability of launch survival of these aircraft from this normal alert posture would range from [deleted] depending on the location of the Soviet SSBN threat and nominal aircraft/aircrew reaction times. The resultant EMT could then range from 50-67 MT from the surviving aircraft [deleted]. These estimates of launch survivability are based on an SLBM attack from Soviet SSBNs at fixed locations off the West Coast ranging from [deleted].

TITAN II MISSILES SURVIVABILITY

Senator LEVIN. If the Titan II missiles are not retired, how many of them, with what number of warheads and with what EMT, would be expected to survive a Soviet first strike, if the Titan's were not launched on warning, during this period when we would have deployed the MX in its interim basing mode?

ANSWER. After riding out a two-on-one attack by Soviet ICBMs in 1987, the Titan II ICBM will have about a [deleted] probability of survival. [Deleted] survivability translates into [deleted] with one warhead apiece, for a total of [deleted] equivalent megatons.

OPERATIONS AND SUPPORT COSTS TO SUPPORT MX MISSILES

Senator LEVIN. What are the operations and support costs annually to support the deployment of the 40 MX missiles in the Minuteman silos interim basing mode?

ANSWER. After Full Operational Capability, MX operations and support cost will be approximately $53 million (fiscal year 1978 dollars) annually.

TITAN II MISSILE FORCE?

Senator LEVIN. What are the annual operations and support costs to support continued deployment of the Titan II missile force?

ANSWER. Continued deployment of the Titan II force would require a return to the budget levels projected prior to the decision to retire the system. The figures below represent operating and support costs as well as several modernization and supportability modification programs.

[Dollars in millions]

	Fiscal year—		
	1982	1983	1984
Projected budget prior to retirement decision	115.2	165.2	135.1
Current projected budget	87.4	89.2	77.2

EQUIVALENT MEGATONNAGE

Senator LEVIN. Which weapons systems have more equivalent megatonnage—(a) 40 MX in the interim basing mode (b) B-52Ds and Titan II missiles combined? Please provide an unclassified response for both pre- and post-Soviet first strike situations.

ANSWER. Equivalent megatonnage (EMT) is only one of many ways in which to compare nuclear force structures and when viewed in isolation EMT can be misleading. It is a static measure and as such does not measure either the quality nor the current or projected utility of a weapon system. In terms of actual military value, the synergism of weapon accuracy, penetrativity, targeting flexibility, range, yield, etc. is of paramount importance. It is the combination of these weapon characteristics, when viewed in light of the mission to be accomplished, that is a more relevant measure of a weapon's value.

Titan II's and B-52Ds have more combined EMT than 40 MX in both pre- and post-Soviet first strike situations. In fact, the combined pre-attack EMT of the day-to-day alert B-52D's and Titan IIs is about two and one half times the EMT of 40 MX in the interim basing mode. Assuming a Soviet surprise attack on U.S. forces in day-to-day alert posture, the combined surviving B-52D and Titan II EMT would be about 10 times that of the surviving MX ICBMS.

However, just as the MX is not optimally suited for missions requiring EMT, the B-52D's and Titan IIs are not as well suited for hard target kill (HTK) missions. The composite pre-attack HTK of Titan IIs and B-52D's in 1982 is less than the projected pre-attack HTK of 40 MX in silos. The prompt hard target kill mission further increases the MX HTK advantage (13.8 HTK for Titan II's, 360.0 HTK for MX's).

TRANSPORTATION OF MX VS D-5

Senator LEVIN. Because the present MX is such a large missile, the Air Force will have to insert it into Minuteman silos in sections. This takes approximately eight days, which would risk detection/location of the missile during this process if it were part of a deceptive basing scheme.

Wouldn't the smaller D-5 missile be easier to transport and insert into any deceptive basing mode, especially one built around present Minuteman silos?

ANSWER. Any deceptive basing scheme would require assembly of the missile at an assembly area rather than buildup in the silo. So, if such a concept were chosen, a different means of assembly than currently planned would be required. The present scheme of placing MX in silos by stages was chosen as a cost savings trade off in transportation equipment and road upgrades since the silo deployment is not considered a deceptive basing mode.

As for the D-5, although it is currently envisioned to be somewhat shorter and approximately 30 percent less in weight than MX it would still be very difficult to deploy deceptively among Minuteman silos. The D-5 would most likely have a large weight growth due to increased structural strength needed to make it compatible with horizontal transportation over long distances. If such weight growth did occur, it would experience many of the same operational difficulties faced by the MX in a deceptive mode in Minuteman areas.

B-1B'S CAPABILITY TO PENETRATE

Senator LEVIN. General Burke, Defense Intelligence Agency witnesses late last year contended that the B-1B would be able to penetrate Soviet air defenses well into the 1990's. However, early in June, 1981, the Secretary of the Air Force signed a memorandum containing charts showing that the B-1B's capability to penetrate begins to degrade well before that. These charts were based on the information developed during the latest B-1 penetration tests, including the new ECM. Please explain this contradiction.

These charts also show that our B-52H's will be able to penetrate for at least one year after the B-1B's penetration ability begins to degrade.

ANSWER. The charts referenced above represent a small subset of a large number of force structure options carefully examined during the decision process leading to the Air Force recommendation on modernization of the manned bomber force. While the selected charts represent essentially "equally capable" forces, it is important to note that this condition would exist only after the modernization process was fully completed in the particular option under consideration. These and other similar charts were developed for projecting budget requirements for various modification programs (principally cruise missile integration) and for doing cost comparisons of the various alternative force structures. They were not intended for definitive projection of operational modes of employment. In this context, the dotted lines contained within each aircraft type reflect evolving weapons carriage/loading options resulting from proposed modification programs. (Note: at the time these charts were prepared cruise missile carriage was not an integral part of the B-1B production configuration.)

The charts then reflect a modernization flow plan for our current and projected bomber forces. While there are many options for time phasing/shifting roles within the strategic bomber force, there is no question that the days of the B-52 as a penetrator are numbered. The Soviets are known to be fielding "look-down, shoot-down fighters," which will significantly improve their ability to shoot down B-52's flying at low level. the Soviets are also developing their own version of an AWACS to provide a survivable and more effective warning and control system. This is the payoff of more than 15 years of heavy investment in air defense R&D. These improvements have led us to plan to phase B-52's out of missions that would require them to penetrate Soviet sophisticated homeland defenses in the late 1980's.

In contrast, the B-1B with its reduced radar cross-section, improved electronic countermeasures, high speed, and cruise missile carriage capability will be capable of serving as both an effective penetrator and a shoot-and-penetrate bomber against the Soviet homeland well into the 1990's. As the B-52 nears the end of its service life and as new Advanced Technology Bombers (ATBs) enter the force in numbers in the mid 1990's, the B-1B's will assume a greater share of the cruise missile carrier mission, eventually replacing the B-52's in this role. The B-1B will serve as standoff cruise missile carrier and conventional bomber well past the year 2000.

B-52G'S AND H'S

Senator LEVIN. These charts also show that our B-52G's and H's, if armed with cruise missiles, will be able to shoot their missiles and then penetrate Soviet air defenses to drop their bombs well into the 1990's, would you agree?

ANSWER. The charts referenced above represent a small subset of a large number of force structure options carefully examined during the decision process leading up to our recommendation for modernization of the manned bomber force. While the selected charts represent essentially "equally capable" forces, it is important to note that this condition would exist only after the modernization process was fully completed in the particular option under consideration. These and other similar charts were developed for projecting budget requirements for various modification programs (principally cruise missile integration) and for doing cost comparisons of the various alternative force structures. They were not intended for definitive projection of operational modes of employment. In this context, the dotted lines contained within each aircraft type reflect evolving weapons carriage/loading options resulting from proposed modification programs. (Note: at the time these charts were prepared, cruise missile carriage was not an integral part of the B-1B production configuration.)

Exacerbating the problem is the fact that Stealth techniques are simply not far enough along to allow us to commit with confidence to a particular Advanced Technology Bomber (ATB) design at this time. Unless the B-1B is produced, there will be a gap between the end of credible reliability of the B-52 as a penetrating bomber and the availability of the ATB.

The main thrust of the chart that showed B-52G's and H's in shoot and penetrate roles will into the 1990's, was to dramatize how long we would have to rely on these less capable and vulnerable forces if we modernized by moving directly to an ATB and bypassed the near term modernization effort, the B-1B.

The limitations of the B-52 make it imperative that production of a replacement aircraft begin immediately. In an effort to keep the B-52 force effective until the B-1B is available and as their penetration capability declines during this decade, these bombers will transition from a penetrator role to a shoot-and-penetrate role, and by the end of the decade will assume a pure standoff delivery role. There is, however, no question that the days of the B-52 as either a penetrator or shoot-and-penetrate aircraft are numbered.

B-1B SHOOT AND PENETRATE TACTIC

Senator LEVIN. These charts show that the B-1B will have to adopt this same "shoot and penetrate" tactic shortly after the B-52Hs must—in order to accomplish their mission. Thus the B-52Hs has equal shoot and penetrate capabilities acording to the charts.

Why should we buy a B-1B if it will not be able to penetrate, according to the Secretary of the AF's own charts, much longer than our B-52Hs?

ANSWER. The charts referenced above represent a small subset of a large number of force structure options carefully examined during the decision process leading to the Air Force recommendation on modernazation of the manned bomber force. While the selected charts represent essentially "equally capable" forces, it is important to note that this condition would exist only after the modernization process was fully completed in the particular option under consideration. These and other similar charts were developed for projecting budget requirements for various modification programs (principally cruise missile integration) and for doing cost comparisons of the various alternative force structures. They were not intended for definitive projection of operational modes of employment. In this context, the dotted lines contained within each aircraft type reflect evolving weapons carriage/loading options resulting from proposed modification programs. (Note: at the time these charts were prepared cruise missile carriage was not an integral part of the B-1B production configuration.)

Our force of B-52s has performed effectively for the past two and a half decades. But, their ability to perform these demanding tasks is diminishing. Because B-52s are not fully hardened against the effects of nuclear blasts and are relatively slow in flying out from their bases, they are more vulnerable to attacks from Soviet submarines patrolling off our coasts. Moreover, because of their large radar reflectivity and relatively slow speed at low altitude, the B-52 will become far less able to penetrate increasingly capable Soviet air defenses during the latter part of this decade.

The limitations of the B-52 make it imperative that we start producing a replacement aircraft soon. Accordingly, we have undertaken a bomber modernization program designed to maintain the usefulness of the B–52 while ensuring our future bomber deterrent capability. These efforts include:

Equipping B–52G's and H's to carry approximately 3,000 cruise missiles. As their penetration capability declines during this decade, these bombers will transition from a penetrator to a shoot-and-penetrate mission and then will eventually assume a pure stand-off delivery role.

Production of 100 B–1Bs with an initial operational capability (IOC) of 1986. The reduced radar cross-section, improved electronic countermeasures, low altitude/high speeed capability and cruise missile carriage capability of the B–1B will enable it to serve as both an effective penetrator and a shoot-and-penetrate bomber against the Soviet homeland well into the 1990s. As the B–52 nears the end of its service life and as new Advanced Technology Bombers (ATBs) enter the force in numbers in the mid 1990's, the B–1B's will assume a greater share of the cruise missile mission, eventually replacing the B–52s in this role. The B–1B will serve as a standoff cruise missile carrier and conventional bomber well past the year 2000.

There have been questions raised about the timing of the various shifts within the strategic bomber force. There is no question that the days of the B–52 as a penetrator are numbered. The Soviets are known to be fielding "look-down, shoot-down fighters," which will significantly improve their ability to shoot down B–52's flying at low level. The Soviets are also developing their own version of an AWACS to provide a survivable and more effective warning and control system. This is the payoff of more than 15 years of heavy investment in air defense R&D. These improvements have led us to plan to phase B–52's out of missions that would require them to penetrate Soviet homeland defenses in the late 1980's.

B–1B VERSUS B–52 G'S AND H'S

Senator **Levin** Why should we buy the B–1B for the "shoot and penetrate" role if we can use the B–52 G's and H's in that role for many years into the next decade and well after these charts show that the Stealth bomber will be able to take over the penetration role from any present type of aircraft?

Answer. The charts referenced above represent a small subset of a large number of force structure options carefully examined during the decision process leading up to our recommendation for modernization of the manned bomber force. While the selected charts represent essentially "equally capable" forces, it is important to note that this condition would exist only after the modernization process was fully completed in the particular option under consideration. These and other similar charts were developed for projecting budget requirements for various modification programs (principally cruise missile integration) and for doing cost comparisons of the various alternative force structures. They were not intended for definitive projection of operational modes of employment. In this context, the dotted lines contained within each aircraft type reflect evolving weapons carriage/loading options resulting from proposed modification programs. (Note: at the time these charts were prepared, cruise missile carriage was not an integral part of the B–1B production configuration.)

Exacerbating the problem is the fact that Stealth techniques are simply not far enough along to allow us to commit with confidence to a particular Advanced Technology Bomber (ATB) design at this time. Unless the B–1B is produced, there will be a gap between the end of credible reliability of the B–52 as a penetrating bomber and the availability of the ATB.

The main thrust of the chart that showed B–52 G's and H's in shoot and penetrate roles well into the 1990s, was to dramatize how long we would have to rely on these less capable and vulnerable forces if we modernized by moving directly to an ATB and bypassed the near term modernization effort, the B–1B.

The limitations of the B–52 make it imperative that production of a replacement aircraft begin immediately. In an effort to keep the B–52 force effective until the B-1B is available and as their penetration capability declines during this decade, these bombers will transition from a penetrator role to a shoot-and-penetrate role, and by the end of the decade will assume a pure standoff delivery role. There is, however, no question that the days of the B–52 as either a penetrator or shoot-and-penetrate aircraft are numbered.

WHY WE NEED B–1 AS A CRUISE MISSILE CARRIER

Senator **Levin**. General Allen, earlier this year—on February 6, before our Committee, responded to a question of mine by stating: "The Air Force position remains that B–52's will provide us with an effective cruise missile carriage capability well into the 1990s."

General Burke, the ATB will become available early in the 1990s, won't it? Dr. DeLauer even gave its IOC in public hearing as very early in the decade, didn't he?

If, by your own statement, the B-52's will be able to carry ALCMs well into the next decade, and the ATB will be available early in the decade, why do we need the B-1 as a cruise missile carrier?

ANSWER. Our force of B-52's has performed a multiple of vital roles effectively for the past two and a half decades. But, their ability to perform these demanding tasks is diminishing. They are becoming more difficult and expensive to maintain and, more importantly, will become increasingly vulnerable to a Soviet first strike and to Soviet air defenses over the next several years. Because the B-52s are not fully hardened against the effects of nuclear blasts and are relatively slow in flying out from their bases, they are more vulnerable to attacks from Soviet submarines patrolling off our coasts than desired. Moreover, because of their large radar reflectivity and relatively slow speed at low altitude, the B-52 will become far less able to penetrate increasingly capable Soviet air defenses during the latter part of this decade.

The limitations of the B-52 make it imperative that we start producing a replacement aircraft soon. Accordingly, we have undertaken a three-part bomber modernization program designed to maintain the usefulness of the B-52 while laying the groundwork for our future bomber deterrent capability. The program calls for:

Equipping our B-52G's and H's to carry approximately 3,000 cruise missiles. As their penetration capability declines during this decade, these bombers will transition from a penetrator to a shoot-and-penetrate and eventually a pure stand-off delivery role.

Production of 100 B-1Bs with an initial operational capability (IOC) of 1986. Its reduced radar cross-section, improved electronics countermeasures, high speed, and cruise missile carriage capability will enable the B-1B to serve as both an effective penetrator and a shoot-and-penetrate bomber against the Soviet homeland well into the 1990s. As the B-52 nears the end of its service life and as new ATBs enter the force in numbers in the mid 1990s, the B-1Bs will assume a greater share of the cruise missile carrier mission, eventually replacing the B-52s in this role. The B-1B will serve as a standoff cruise missile carrier and conventional bomber well past the year 2,000.

Development and production of an ATB with an IOC in the 1990s. ATB's will be used initially to ensure effective penetration against the most heavily defended targets in the Soviet Union. Over the long term, the ATB will allow us to maintain the advantages of manned bomber weapons delivery into the Soviet Union into the next century.

RETIREMENT OF B-52D'S

Senator LEVIN. General, despite strong congressional direction to keep all our B-52D squadrons operating until the B-1 IOC in late 1986, the Air Force yesterday announced it was retiring three of the five B-52D squadrons later this year or early next year.

In its announcement the AF said: "The retirement of three B-52D squadrons will free up critical resources for higher priority programs which are designed to end the decline in U.S. strategic capability. . . ."

However, Congress was very clear in its direction to the AF in the Conference Report on the fiscal year 1982 DOD Appropriations Act:

The conferees agree that the B-52Ds should be continued in operation until such time as the B-1 or other new strategic bomber becomes available. At that time existing B-52G and H model aircraft currently devoted to SIOP missions can be freed and programmed for the conventional warfare role. The B-52Ds are to be retained and supported as planned in the original President's budget submission.

Why is the AF ignoring the directly expressed will of Congress by retiring these squadrons of B-52Ds in 1982 and 1983?

General BURKE. Retirement of the B-52Ds has been phased with the deployment of the B-1B. We plan to retire the three squadrons in 1983 and retain the remaining two until the B-1B is completed. This provides us an affordable response to congressional direction within very real fiscal constraints while allocating our priorities to the urgent task of modernizing our strategic forces. Additionally, Air Force plans a modification to 67 B-52G's in fiscal years 1983-84 which will provide a capability for external carriage of gravity bombs. This will provide increased flexibility for conventional power projection. These B-52G's will formally transition into the conventional role as the last two B-52D squadrons retire.

B-52 FUNDING

Senator **Levin**. Your rationale for retiring the B-52Ds is that there are higher priority needs which must be financed and therefore you are retiring these aircraft to find the money to fund these needs.

Since Congress last year specifically gave you money last year to continue operating the B-52Ds through fiscal year 1982 and ordered you to put money in the budget to maintain them through fiscal year 1986—with the clear implication we would approve such funding—why should you be concerned that there would be insufficient funding available for other programs as well as the B-52Ds?

General **Burke**. The Air Force must operate not only within very real fiscal constraints, but with priorities established for given resources. In this case, maintaining the extra three squadrons through fiscal year 1986 would cost an additional $1.2B. The funding would have been invested in an aging fleet with limited weapons carriage, outmoded avionics, limited target selection, and a continually decreasing capability to penetrate known defenses. In addition, these squadrons would have required 84 tankers to perform their mission which could be used more effectively to support B-52s carrying ALCM. As a consequence, retaining all five squadrons of B-52Ds did not withstand the priorities. It is our judgment that we can best counter the increasing Soviet threat by investing in the urgently needed modernization of our strategic forces.

PURCHASE OF SPARES FOR THE B-52D'S

Senator **Levin**. The $62 million added by my amendment to the fiscal year 1982 DOD Appropriations Act on the Senate side, which ensured its inclusion in the final bill since the House already had included it, was supposed to finance purchase of spares for the B-52D to keep them operating in fiscal year 1983 and beyond. This is because there is a two year lead time between appropriation and delivery of these spares. All this information came from the Air Force.

If you intend to retire three squadrons of B-52D, are you going to seek a reprogramming of the money or a recision?

Answer. Of the $62 million added for the B-52D, $12 million was intended for modifications and $50 million for spares. However, the final fiscal year 1982 DOD appropriations actions inadvertently allocated the entire $62 million to the modification account. A reprogramming action has been submitted to correct this error. The Air Force proposes to retain the $12 million in the modification account to fund other B-52 series modifications, and to apply the $50 million in spares to other B-52 War Reserve Materiel requirements to support the Strategic Projection Force.

HIGHER PRIORITY NEEDS TO BE FUNDED WITH B-52 MONEY

Senator **Levin**. You say that the higher priority needs to be funded with the B-52D money "are designed to end the decline in U.S. strategic capability."

Yet, aren't you precipitating and deepening this decline during the period of your supposed greatest vulnerability by phasing out these weapons? According to SAC Commander Davis in testimony late last year, you are opening rather than closing that window of vulnerability.

Answer. We recognize that retiring any strategic system reduces our capability; however, with the fiscal constraints we faced we elected to retire our oldest, least capable, and most costly to maintain systems while turning our priority efforts to other elements of the President's strategic modernization program. The B-1B, ALCMs, and additional Minuteman IIIs at Malmstrom are all upgrades that, together, help redress the strategic balance.

PREMATURE RETIREMENT OF THE B-52D'S

Senator **Levin**. There is great discussion in this administration about bargaining chips. Aren't we giving up a bargaining chip in START with this premature retirement of the B-52Ds? What has the administration received in trade from the Soviets for this retirement?

Answer. The initial retirement of B-52Ds will include those aircraft which have not had the Programmed Depot Maintenance (PDM) and bomb navigation system modifications. These are the least effective systems of the B-52 force and, as such, have minimal "bargaining chip" value in negotiations with the Soviet Union.

The Administration has received nothing from the Soviet Union in response to the B-52D drawdown.

The recent decision by the Administration to retire the B-52Ds as part of the overall strategic modernization program will free up critical resources through operational, modification, and spare parts procurement cost avoidance which can be applied to fielding newer, more capable and cost-effective systems. Rather than weakening the US bargaining position in the START process, the commitment to modernization will permit the US to negotiate from a position of increased strength.

EXPLAIN ADDITIONAL R. & D. FOR THE B-1B

Senator LEVIN. A major component of the effort to control cost of the B-1B program—to keep it within its alleged $20.5B (fiscal year 1981) total—is that the design of the aircraft and its sub-components has been frozen. On November 10, 1981, AF responded for the record to Chairman Warner:

"The AF has made a firm commitment to the configuration of the B-1B aircraft. While there will no doubt be changes to the B-1B's configuration at some time during its 30 year operational life, there are no such changes anticipated in the near term."

If this is true, why does the AF need to spend $2.4B (fiscal year 1981) in additional R&D for the B-1B? How can you assure the Committee that the results of this R&D will not lead to configuration changes? Is it prudent to expect that such R&D will *not* lead to such changes? Will you admit that the possibility exists that it will, and that this will lead to increased costs to the program?

ANSWER. The B-1B is not a new design, but rather a derivative of the original B-1 aircraft, which was designed, developed and tested until 1981. Because the B-1B is a derivative of the original B-1, with its associated technology investment, the Air Force is confident that the final portion of the development and the production programs can be accomplished within the $20.5 billion (fiscal year 1981 dollars) acquisition program estimate.

But, the B-1B production schedule, and therefore program cost, is contingent upon an aggressive front-end RDT&E program. While the RDT&E effort contains no new technology development, there is considerable integration and engineering to be accomplished in order to support the production/operational deployment schedule. The remaining B-1B development efforts, which are estimated to cost $2.5 billion (fiscal year 1981 dollars), can be divided into three major categories:

(1) RDT&E activities that were incomplete/deferred in 1977 at the time the B-1A production/deployment portion of the program was terminated.

(2) Activities that will incorporate producibility/cost redesigns which will reduce production and operations/support costs.

(3) Activities that will incorporate the multi-role bomber features/capabilities in accordance with Congressional direction and the fiscal year 1981 Defense Authorization Act.

While these activities will require the expenditure of considerable effort, they are based on throughly developed, tested, reviewed and assessed concepts that need no new technological developments. These activities and any minor engineering/integration revisions that might result can be accomodated within the current program.

DESIGN OF THE B-1B

Senator LEVIN. What portions of the design of the B-1B and its sub-components are not final? By when do you expect to finalize such designs?

What percentage of the plane's program unit cost, and total program cost, it represented by each portion of its design which is not finalized now?

ANSWER. The System Design/Configuration for the B-1B has been finalized and is complete. The detailed "production design" work is currently on-going. Engineering reviews of airframe and/or major sub-system design changes to transition from B-1A aircraft number 4 to the B-1B configuration are indicated in the table below for the four associate contractors. Also shown are the scheduled Configuration Reviews, when approximately 90 percent of the detailed design/production drawing will be released for manufacturing.

Contractor	Component	Engineering review	Configuration review
Rockwell	Airframe	April 1982	January 1983
Boeing	Offensive avionics	July 1982	July 1983
AIL	Defensive avionics	April 1982	September 1982
General Electric	Engines	Completed	Completed

CLOSE MONITORING OF THE B-1B PROGRAM

Senator LEVIN. DOD and AF promise close monitoring of the program at both the prime and subcontractor level. Will the prime contractor be dual-sourcing its major sub-contracts as a means to control costs? Which major subcontracts will be awarded on the basis of competition?

Will the government furnish major sub-components as "Government Furnished Equipment" to avoid paying additional overhead to the prime contractor? If not, why not?

ANSWER. The four associate contractors will be dual-sourcing selected items. For a 100 aircraft buy, dual-sourcing certain items could actually increase costs since in some cases only one subcontractor has an open production line and there are costs incurred to open new production lines. Moreover, assuming two sources, each subcontractor would most likely produce one-half of the required equipment/parts, and neither one would realize the savings associated with a 100 aircraft learning curve.

All B-1A/B-1B sub-contracts were awarded on the basis of competitive bidding. In addition, Government Furnished Equipment (GFE) is being specified whenever possible. All GFE is procured through competitive bidding to the maximum extent possible.

BASELINE COST OF THE B-1B

Senator LEVIN. Many of the costs associated with development and acquisition of the B-1B were excluded by DoD and the AF from the "program cost" total of $20.5B, primarily on the basis that such costs usually are not included in the R&D and procurement costs for any aircraft system. I agree with AF/DoD on some of these exclusions on this basis. However, other exclusions raise questions I want to pursue.

First, I have been informed that AF intends to spend about $1 billion in fiscal year 1981 dollars, more than $1.2 billion in current dollars, to develop and procure about 300 "common strategic rotary launchers (CSRL)" for internal carriage of nuclear weapons on B-52, B-1s, and ATBs.

Presently, CSRL R&D/procurement costs are being funded in the budget line item for "B-52 Modifications." Shouldn't the B-1B's share of the R&D be included in the baseline cost of the B-1B? How much would this add to the $20.5B figure?

ANSWER. Currently, there are separate launcher designs for the B-52, B-1B, and ATB for the carriage of nuclear bombs, SRAM, and ALCM. The potential exists for the development of a single launcher to accommodate these weapons. Further, it is desirable for all new rotary launchers to be compatible with future conventional weapons—for example, the Medium Range Air-to-Surface Missile (MRASM) and the Conventional Standoff Weapon (CSW). To avoid proliferation and to reap the potential cost, operational, and support benefits associated with a common design, we are proceeding with initial activities that we anticipate will lead to the development of a CSRL.

The CSRL is intended for employment on all three bombers and is, therefore, being developed in a separate program element unique to this activity. As is the case for the ALCM which will be carried on the CSRL, systems which have application on a variety of aircraft are normally funded in this manner and not identified with any particular aircraft program.

ADDITIONAL ACTIVITIES COST

Senator LEVIN. I understand that the approximately $1B in fiscal year 1981 dollars for the CSRL also does not include expenditures for spares, flight tests, installation and structural modifications to the B-1B/B-52/ATB airframes. How much additional do these activities cost, and shouldn't that portion of those costs relating to deployment of the CSRL on the B-1 be added to the $20.5B baseline?

ANSWER. To avoid proliferation and to capitalize on the potential cost, operational, and support benefits associated with a common design, we are proceeding with initial activities that we anticipate will lead to the development of a Common Strategic Rotary Launcher (CSRL). While the CSRL is currently in the early stages of concept definition and design development, we do not anticipate unusual and/or costly B-1B installation or structural modifications will be required. Should minor cost requirements develop as the design matures, those needs will be accommodated within the current B-1B program estimate.

Should the CSRL design prove compatible, funding for spare parts as well as flight test costs associated with initial CSRL applications on the B-1B will be provided for within the $20.5 billion estimate.

HOW CSRL FITS INTO THE B-1B

Senator **Levin**. There are other issues associated with the CSRL which could add to its costs, especially as they relate to the B-1B. The B-1B program office has informed the General Accounting Office that development of the CSRL concurrent with the B-1B will be a "high risk" program because of its technological complexities.

Is it not true that there are questions as to exactly how the CSRL will fit into the B-1B?

Answer. The CSRL currently is in the early stages concept definition/design development; therefore, the precise interface definition between the B-1B and the CSRL has not been finalized. However, the Air Force does not anticipate any major installation and/or aircraft modification impacts resulting from incorporating the CSRL into the B-1B.

The schedule risk associated with the B-1B/CSRL program is considered medium to low because the B-52 program will require a proven CSRL design several months earlier than the B-1B in order to support the B-52 initial operational capability of internal carriage of the ALCM.

PRODUCTION OF THE CSRL

Senator **Levin**. Is it not true that production of the CSRL is to begin to permit bomber installations in 1985, but that testing as to whether the CSRL will work—its development and operational testing—will be done at the same time units are being produced?

Is it not true that any problems experienced during testing could lead to costly modifications to those units already produced and installed?

Answer. The development and operational testing of any ALCM launcher, whether it be the originally proposed ALCM launcher or the CSRL, should not be significantly different. Both will require the commitment of long lead funding prior to test completion. The broader range of capabilities inherent in the CSRL naturally increases the potential risk associated with the program. However, the CSRL does not present an unusually complex engineering challenge and any increases in risk are believed manageable within the current program scope.

BASIS FOR AF'S DECISION THAT A CSRL IS REQUIRED

Senator **Levin**. What is the basis for the AF's decision that a CSRL is required, and that about 300 are needed, not including spares?

Answer. Currently, there are separate launcher designs for the B-52, B-1B, and ATB for the carriage of nuclear bombs, SRAM, and ALCM. In reviewing the internal weapons carriage on current and planned bomber forces, we recognized an opportunity to consolidate several rotary launcher development efforts into one Common Strategic Rotary Launcher (CSRL). Further, it is desirable for all new rotary launchers to be compatible with future conventional weapons—for example, the Medium Range Air-to-Surface Missile (MRASM) and the Conventional Standoff Weapon (CSW). While the number of launchers has not been established yet, the number eventually produced will satisfy the operational requirements of the B-52, B-1B, and the ATB. To avoid proliferation and to reap the potential cost, operational, and support benefits associated with a common design, we are proceeding with initial activities that we anticipate will lead to the development of a CSRL which can be employed on all three bombers.

ALTERNATIVES TO DEVELOPMENT OF A CSRL

Senator **Levin**. Were alternatives to development of a CSRL considered, such as modifications to the current SRAM (short range attack missile) or to the ALCM rotary launcher used for test purposes on the B-52Gs?

Answer. Yes. However, to be B-1B and ATB compatible, B-52 launcher designs would have required significant modifications to the point that they became essentially new designs and therefore no more cost effective than a specific B-1B launcher design.

CSRL COST-EFFECTIVENESS

Senator **Levin**. Was CRSL determined to be more cost-effective to any alternatives? Please provide a detailed cost-effectiveness comparison for the record.

Answer. The Common Strategic Rotary Launcher is considered a far more cost-effective approach to providing weapon launchers for B-52s, B-1Bs, and an Advanced Technology Bomber than plans that previously existed. Before the CSRL program, the B-52 had two launchers: The SRAM launcher which was already in the inventory, and the ALCM launcher (stretched version of the SRAM launcher) which was in development. The SRAM launcher required several update modifications to meet safety standards and to integrate with the new B-52 OAS. The ALCM launcher redesign required update modifications for the same reasons. Concurrently, Rockwell was planning to build three separate launchers for the B-1B; one for gravity weapons, one for SRAM, and one for ALCM. We also anticipated the future development requirements for the Advanced Technology Bomber (ATB) with its own launcher requirements for gravity, SRAM and ALCM weapons. In essence, we had six different launcher designs to equip three different strategic bombers.

Had we proceeded on this course, we would have borne the costs of multiple launcher designs, plus their peculiar support equipment and several production lines. We recognized an opportunity for consolidation, and the CSRL program was conceived to develop a common design for all these aircraft, with common support equipment and a single production line. The savings opportunities were truly significant, both in investment and ownership costs.

Preliminary estimates indicate that $35–40 million can be saved with this approach in the B-52 program alone. In the long term, launchers designed, developed and procured for the B-52 force in the near term can be transferred for later use in the ATB or the B-1B. Thus, we can avoid buying one hundred or more launchers at roughly one million dollars each, not including installation and support equipment costs.

We are now in the process of developing alternative CSRL designs in a competitive environment (release of a request for proposal is imminent) in order to provide the most cost-effective solution. Evaluation of the proposals will allow us to complete our cost and performance analyses to determine total cost savings associated with the CSRL approach. What we can quantify at this point is that: previously required modifications and procurement investments for SRAM, gravity, weapons, and ALCM launchers in the B-52 have been greatly reduced now by the CSRL approach; a unique ALCM launcher design for the B-1B is no longer required; the total number of launchers previously envisioned for the ATB has been reduced by two-thirds; the CSRL procured for the B-52s (currently programmed at 103 launchers) can be used in either the B-1B or the ATB after the B-52s are retired, thus avoiding duplicative investments for the new aircraft. When you add the significant ownership efficiencies to these reduced investment levels, the cost-effectiveness of the CSRL approach becomes readily apparent.

ATB'S DESIGN INCOMPATIBLE WITH CSRL

Senator LEVIN. GAO has been told that the CSRL configurations presently being considered will not fit into the ATB because the ATB's design is incompatible with them. This could mean the CSRL may never be used on the ATB, and that the AF would have to develop and procure another weapons launcher for the ATB.

This would increase the costs to the B-1B program, wouldn't it, if some CSRL R&D/procurement could not be apportioned to the ATB program? Wouldn't it also make the ATB more expensive, if a different weapons launcher had to be separately developed and procured?

ANSWER. There seems to be a misunderstanding here. There has never been any question of CSRL compatibility with the ATB. Prior to the October 1981 decision to pursue a common launcher, the Air Force was pursuing a unique ALCM launcher design for the B-52 (in addition to a modified SRAM launcher), unique launcher designs for the B-1B, and yet another design for the ATB. The Common Strategic Rotary Launcher (CSRL) was conceived as a means to reduce these unique launcher designs and attendant support equipment and, thus, reduce overall costs to the Air Force by adopting a common approach that could be used interchangeably in all three bombers.

ADDITIONS TO BASELINE

Senator LEVIN. If CSRL is not pursued for B-1B, shouldn't mods/procurement of present SRAM/ALCM launchers be added to the $20.5B baseline.

ANSWER. Should the CSRL not be pursued, the B-1B baseline acquisition program ($20.5 billion in fiscal year 1981 dollars) has sufficient funding for the design and procurement of a combination of 300 SRAM, bomb, and ALCM launchers/racks.

MISSING ITEMS FROM B-1B $20.5B BASELINE

Senator LEVIN. The B-1B program baseline includes $800 million to give the aircraft the capabilities to carry and launch cruise missiles. These capabilities, at this cost, were added to the baseline program at the direction of the Secretary of Defense.

Yet, I have been informed by the General Accounting Office that several components needed to employ ALCMs on the B-1B are not included in the $20.5B baseline cost and the $800 million added for cruise missile capabilities. These missing items are: Aircraft changes—such as wiring and interface units for aircraft/missile computers to exchange information—necessary for internal ALCM carriage; development of the CSRL or R&D procurement for variants of present SRAM/ALCM launchers;

In each case, why has the AF excluded these costs from the $20.5B bsseline B-1B program? How much would each add to the program in current and fiscal year 1981 dollars?

ANSWER. The $20.5B fiscal year 1981 dollars baseline cost estimate for the B-1B acquisition program contains sufficient funding to provide both an internal and external ALCM carriage/launch capability. The cost of procuring 100 ALCM launchers, whether they be the originally planned ALCM launcher or the CSRL, can be accommodated within the current B-1B $20.5 billion estimate.

DEVELOPMENT AND PROCUREMENT OF B-1B TRAINING SIMULATORS

Senator LEVIN. Last year during our hearings, when I questioned why some $337 million (fiscal year 1981) for development and procurement of B-1B training simulators was not included in the baseline program, you, General Burke, said that such costs usually are excluded from any aircraft program and are funded as part of a separate simulator program office.

Is it not true that, in the past, this separate simulator program office was funded by transferring money from the particular aircraft program to the simulator office for development/procurement of the simulator for that particular aircraft?

Under this system, the simulator funding was included in the budget for the aircraft, as part of its R&D and procurement funding, was it not?

This system was used in obtaining simulators for the F-15 and F-16 aircraft was it not?

ANSWER. There has been, basically, three ways of funding simulator programs. For example, the B-52 Weapons System Trainer (WST) program was managed and funded directly by the Simulator System Program Office (SPO). The F-16 simulator is managed by the Simulator SPO and funded through the aircraft SPO. However, the F-15 simulator is managed and funded by the F-15 SPO.

SIMULATORS FOR THE B-1B

Senator LEVIN. GAO contends that the simulators for the B-1B is the first time in recent years that the AF is providing funds directly to the simulators office for such development/procurement, instead of funding it through the particular aircraft program office involved. Is this true?

ANSWER. No. The B-52 Aerial Refueling Part Task Trainers, the KC-135 Boom Operator Park Task Trainer, and the B-52 Electro Optical Viewing Systems were developed under Project 64227F, with funds provided directly to the Simulator SPO. The Air Force believes this is the best way to ensure delivery of an optional trainer to the field and intends to continue this funding approach on all new simulator programs.

PROGRAM ELEMENTS FUNDING

Senator LEVIN. Would you provide for the record all the program elements funding each of the simulator types under development/procurement by the AF simulator's office?

ANSWER. Simulator programs managed by the Simulator SPO and associated program elements include the following:

Program	Development	Program element	Production
B-52/KC-135 WST	64227F		11113F
	11113F		11142F
B-52 ARPTT	64227F		

Program	Development	Program element	Production
KC-135 BOPTT	64227F		
A-10			27131F
F-16			27133F
EF-111A OFT	64220F		27252F
C-130			41115F
C-5/C-141 ARPTT	41119F		41119F
	41118F		41118F
F-106 AGPTT			12111F

Future simulator programs will be developed under PE 64227F, flight simulator development.

FINANCING METHODS FOR SIMULATORS

Senator LEVIN. If the AF changed its financing methods for simulators, when did this occur? When did AF procure simulators for the F-15 and F-16?

ANSWER. The Air Force has varied its financing methods for simulators. For example, funds were provided directly to the Simulator Program Office (SPO) for the B-52 WST program. However, funds for the F-16 were provided to the Simulator SPO through the aircraft office. The Air Force believes it is more effective to procure simulators apart from the aircraft and intends to procure future simulator programs in this manner. The original F-15 simulator contract was awarded in 1973, and the F-16 simulator contract was awarded in 1977.

TESTING FOR ELECTROMAGNETIC PULSE

Senator LEVIN. The B-1B program office has told the GAO that is has not decided whether to conduct testing for the electromagnetic pulse effects of a nuclear explosion.

Last year, DoD also said that EMP tests would be done. Dr. Wade (Prin. Dep. Under Sec. for R&D), stated on October 28, 1981, that "EMP testing using the trestle facility is planned for the B-1B."

If this is so, why is the B-1B program office saying it has so far not decided whether to conduct EMP test?

ANSWER. The B-1B has been specifically designed to nuclear hardness specifications to include blast, EMP, radiation effects, and thermal effects. In addition, all new critical components will be individually tested to ensure compliance with the hardness criteria.

In as much as the B-1 is designed to these hardness standards the Air Force currently believes that EMP tests conducted at the trestle facility would be most productive if they were deferred until the aircraft has been maintained by the using command for a period of time. This approach will provide a confidence check of our procedures for maintaining the desired hardness levels during normal day-to-day operations and maintenance.

Therefore, it is not a matter of whether or not the B-1B will be subjected to EMP testing using the trestle facility, but rather when will the testing be accomplished.

THREE-LEVEL MAINTENANCE CONCEPT

Senator LEVIN. With the three-level maintenance concept, won't it be more expensive, since the costs of developing and procuring the sophisticated electronics and other equipment in "Avionics Intermediate Shops" would more than offset the savings from avoiding purchases of additional spares needed under the two-level concept?

Won't this mean that the $20.5 baseline program cost will increase?

ANSWER. The $20.5 billion (fiscal year 1981 dollar) baseline program has approximately $2.9 billion dedicated exclusively to logistic support and initial spares. The Air Force will be using these monies to develop a support system for the operational B-1B weapon system. The B-1B maintenance concept is being carefully studied at this time. Based on all data currently available, we believe that a mixed two-level/three-level support system will provide the most cost effective approach for the B-1B. In addition, we anticipate such a system can be established within the $2.9 billion (fiscal year 1981 dollar) available for that purpose, without any adverse impact to the $20.5 billion (fiscal year 1981 dollar) estimate.

NUCLEAR WEAPONS CERTIFICATIONS

Senator LEVIN. Last year, when I asked whether the B-1B would be able to stand nuclear alert—whether it would have completed its nuclear weapons certifications—at its IOC in late 1986, I was told "yes".

Yet, later responses for the record disclosed that the B-1B would only be certified for two types of nuclear weapons at its IOC—gravity bombs and SRAMS. Certification for the ALCM would come later.

Last week, I was informed by the GAO that even at its IOC, the 15 B-1B's would be certified to deliver only two of the five bomb and SRAM type weapons and then only from the optimum delivery points of these two weapons.

I was informed that there would be a number of launch points in the operational envelope of the B-1B from which it will not be able to launch even these two weapons because the planes and their pilots will not have certified by IOC that they can launch from these points without risking damage to the aircraft or degradation to weapons performance.

Isn't it a bit unlikely that in any war with the Soviets, our pilots can expect they will be afforded the luxury of reaching the optimum points for their weapons?

ANSWER. The weapons certification program is designed to provide for the certification of the safe separation of weapon and aircraft at a wide range of operationally useable altitudes and airspeeds. Those portions of the total B-1B flight envelope so certified will enable a combat ready SAC aircrew to successfully complete their combat mission.

By its Initial Operational Capability (IOC), the B-1B will be certified for the carriage and release/launch of at least: one gravity nuclear weapon, the Short Range Attack Missile (SRAM), and two conventional weapons. The Air Launched Cruise Missile (ALCM) certification program will be completed at the earliest opportunity consistent with the availability of production equivalent assets.

LACK OF NUCLEAR WEAPONS DELIVERY

Senator LEVIN. Doesn't the lack of nuclear weapons delivery certification for all the other launch points possible for even these two weapons [1] represent a degradation in the B-1B's capabilities at IOC—compared to what is being advertised?

ANSWER. The weapons certification program is designed to provide for the certification of the safe separation of weapon and aircraft at a wide range of operationally useable altitudes and airspeeds. Those portions of the total B-1B flight envelope so certified will enable a combat ready SAC aircrew to successfully complete their combat mission.

B-1B NUCLEAR WEAPONS CERTIFICATIONS INCLUDED IN BASELINE

Senator LEVIN. Last year, Gen. Burke, you said the nuclear weapons certifications for the B-1B would be included in the baseline $20.5. Were you referring to only two of the five bomb and SRAM weapons, or to all the gravity bombs, SRAM, and ALCM weapons?

If not, how much additional above the baseline will it cost to certify the B-1B for these additional nuclear weapons?

ANSWER. By its Initial Operational Capability (IOC), the B-1B will be certified for the carriage and release/launch of at least one gravity nuclear weapon, the Short Range Attack Missile (SRAM), and two conventional weapons. The Air Launched Cruise Missile (ALCM) certification program will be completed at the earliest opportunity consistent with the availability of production equivalent assets.

The nuclear weapons certification program currently included in the $20.5 billion (fiscal year 1981 dollars) baseline will certify the primary nuclear weapons essential for the B-1B to perform its nuclear mission. Additional nuclear weapons will be certified as required to satisfy additional/future operational requirements. The costs associated with additional certifications will depend on the extent to which these efforts can be combined with other weapons certification/operational testing and/or how much is unique to the particular weapon being certified.

COMPREHENSIVE BASING PLAN FOR BOMBER FORCES

Senator LEVIN. Does the Department have a comprehensive basing plan for bomber forces over the decade? Since B-52s will be retained through much of the decade at the same time that the B-1 is being fielded, is there sufficient basing available? Does the Air Force intend to have mixed bases (combination of B-52s and B-1s) or will the bases be limited to single aircraft type? What basing costs for bombers have been included in the current five-year plan?

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[1] Gravity bombs and SRAM's.

ANSWER. Following the President's October 2, 1981, announcement on strategic force modernization, the Air Force began assessing the impact on our current and announced basing structure. As you are aware, we had previously announced a bomber realignment plan in January 1981, whose goal was to reposition B-52G ALCM forces inland and B-52Ds on the coast. Any new plan would have to address: retirement of the B-52D, deployment of the B-1B in the mid-1980s, ALCM deployment on the B-52H, procurement of additional KC-10 aircraft, development of an Advanced Technology Bomber (ATB), and a conventional/training role for a portion of the B-52G force.

The Air Force considered the above requirements and on February 10, 1982, announced the first phase of a rebasing of strategic forces to implement the President's modernization decisions. This first phase will allow us to maintain a dispersed and survivable B-52 basing structure while providing flexibility for introduction of the B-1B and ATB in the years ahead. We intend to continue evaluating our force structure and beddown options as deployment of the B-1B draws nearer, and plan to announce the first B-1B base concurrent with the fiscal year 1984 President's Budget.

With appropriate construction, the Air Force currently estimates that there will be adequate basing available for bomber forces as the B-1B is being fielded. The current FYDP includes funding for B-1B, ALCM, B-52 and SRAM basing. However, we plan to revisit these costs during our fiscal year 1984-88 POM deliberations. The Air Force does not now envision the need for mixed bases of B-52 and B-1B aircraft.

AIR-LAUNCHED CRUISE MISSILES

Senator LEVIN. The Reagan Administration promotes the fact that it is buying more ALCMs than the Carter Administration as an indicator of its "toughness."

Yet, according to the Library of Congress, the last Administration would have deployed 1800 ALCMs by fiscal year 1986. Two weeks ago, SAC Commander, General Davis, said only about 1500 ALCMs would be available by fiscal year 1986.

Isn't this another indication that this administration is opening the alleged "window of vulnerability" wider in the near future (to pay for the B-1B)?

ANSWER. The number of ALCMs available by fiscal year 1986 will actually exceed the programmed Carter Administration figure by over 200 missiles. The difference in the figures stems from delivery platform availability. In the fiscal year 1985-86 timeframe, we will have slightly fewer delivery aircraft available because of B-52D phase out and the use of some B-52Gs in a conventional role. As the B-52H is modified to carry ALCM and the B-1B is phased in, we will have fewer delivery aircraft available in this 1985-86 timeframe then under the Carter program, but will have a higher overall ALCM capability when considering the extra missiles could be used to reload the delivery aircraft. This Administration's bomber force, with B-1Bs, will provide much more capability in 1986 and beyond than would have been provided by the previous bomber program.

Senator WARNER. We will now proceed in executive session.

[Whereupon, at 10:50 a.m. the subcommittee proceeded in executive session.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

WEDNESDAY, MARCH 10, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

SPACE SYSTEMS

The subcommittee met, in executive session, pursuant to notice, at 11:31 p.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Quayle, and Exon.

Staff present: Frank J. Gaffney, George K. Johnson, Jr., José E, Martinez, and Patrick L. Renehan, professional staff members; Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; and Robert Nichols, assistant to Senator Jackson.

Senator EXON [presiding]. Gentlemen, if I could have your attention, the Chairman has asked me to convene the meeting and proceed. He will be in shortly.

I believe that Dr. Cooper has another appointment at 12 o'clock or thereabouts, so let's just move right into your testimony, and I would ask you to proceed, Dr. Cooper, in any fashion that you like.

STATEMENT OF DR. ROBERT COOPER, DIRECTOR, DEFENSE ADVANCE RESEARCH PROJECTS AGENCY, ACCOMPANIED BY MAJ. GEN. DONALD L. LAMBERSON, USAF, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING; AND BRIG. GEN. BERNARD P. RANDOLPH, DIRECTOR, SPACE SYSTEMS AND COMMAND, CONTROL AND COMMUNICATIONS RESEARCH, DCS/DEVELOPMENT AND ACQUISITION, HEADQUARTERS, USAF

Dr. COOPER. Thank you very much, Senator.

I would like to submit a comprehensive statement for the record, if I could.

Senator EXON. Without objection, you are most welcome.

Dr. COOPER. I would like to introduce my colleagues here at the table. I have on my left Maj. Gen. Don Lamberson who is my Deputy and who is the focal point for directed energy weapons in the Office of the Secretary of Defense. On my right is Brig. Gen. Bernard Randolph who is the Director of Space and C^3 on the Air

Force staff. Each of these gentleman will be delivering a statement later.

I would like to summarize some of the key points that are made in the statement that I have submitted for the record.

In order to provide a perspective for the Defense Department space programs, permit me to briefly discuss recent Soviet space activities. Soviet space activities continued at a high launch rate during the past year. This is indicative of an expansion in their capabilities. The Soviets attempted 100 launches, more than the 89 launches each in 1979 and 1980, and placed 124 payloads into orbit, exceeding the previous record of 118 set in 1978. We expect this high rate to continue through the 1980's with the advent of new systems and capabilities.

Development continues on [deleted] new space boosters, one in the Saturn V class, [deleted]. Development also continues on large, permanently manned space stations and complexes. The Soviet military space capabilities include an antisatellite system, [deleted] and flight test facilities. They have ever-expanding communications relay satellite systems to support Soviet ground, sea and air forces, and various military satellite networks for navigation, meteorological and R. & D. support.

A significant feature of the Soviet space program, and one which has considerable military potential is their manned program. Salyut 6 completed 4 years in orbit on September 29 of last year and remains in orbit today. Two cosmonauts ferried on an improved Soyuz performed a 75-day mission beginning the 12th of March last year. On June 19 of last year, the Soviets docked Cosmos 1267 to the Salyut 6 spacecraft. This test was described as a test of rendezvous and docking and the subsequent dynamics of two large space stations. According to the Soviets, Cosmos 1267 type vehicles will be used in the future as space station modules, each carrying equipment required for particular missions.

The events of 1981 certainly portend the advent of a new modular space station for the Soviets and move them well along the way toward the goal of a large, permanently manned space station.

EXPANDING SPACE ACTIVITIES

Let me turn now to our own activities. Space activities of the Department of Defense are continuing to expand, maintaining the trend of the past few years. Our military forces are becoming increasingly dependent upon space capabilities. I might note with attendant increases in effectiveness.

In fiscal year 1983 we have requested $8.5 billion for the Department of Defense space program. This represents a real growth of about 20 percent relative to the $6.4 billion appropriated in fiscal year 1982.

Truly significant space accomplishments of this past year were the successful flights of the Space Shuttle *Columbia.* The Space Shuttle provides the key for a sustained presence in space by the United States. The capability to deploy, retrieve, service, and repair, operational platforms is at hand. NASA has taken the lead in the development of the Shuttle. The Defense Department has made a strong commitment to exploit the Shuttle and its associated technologies in our future space planning. We have accepted responsibility for the development and operation of the Shuttle launchsite at Vandenberg for polar orbiting missions. We have also taken responsibility for development and production of the inertial upper stage for use on both civil and DOD space missions and the development of a number of Shuttle related operational capabilities which will enable the DOD to fully exploit the Shuttle.

The increasing capabilities of military space systems and the operating forces' reliance on them mark military satellites as attractive targets and underscores the importance of free access to space for our national systems. The Soviet Union's deployment of an operational antisatellite system demonstrates their understanding of that situation and provides additional rationale for DOD consideration of the role of space weapons.

We must [deleted] develop means to deter an enemy from using antisatellite weapons against our military satellites. Furthermore, if deterrence fails, we must be able to protect our satellites using, if necessary, active satellite defense weapons.

In the area of military satellite communications, we have spent a year and half on a joint effort with all of the services and agencies involved to define a new Milsatcom architecture. This architecture relates combat and combat support needs to near, mid- and far-term Milsatcom systems in the presence of the evergrowing Soviet threat. The heart of this architecture is a new satellite which we call Milstar, a system which provides survivable, enduring, jam resistant communications to small and mobile terminals of the strategic and tactical forces.

A joint program office has been established at the Air Force's Space Division where system definition efforts are now under way for Milstar. We anticipate the DSCS III satellite program will continue to provide its unique and vital services throughout the 1980's. We are asking for funds to continue the acquisition of three additional Fltsatcom satellites to prevent a strategic communications gap until the Milstar system is sufficiently operational.

I would like to jump to the area of meteorology. The Defense Meteorological Satellite program, DMSP as we call it, supports DOD needs for weather information. Its operational requirements dictate the collection of weather data in centralized centers from at least two satellites continuously in orbit, obtaining coverage from all parts of the earth at least four times each day. Regional weather data is also transmitted in real time to transportable readout stations at key locations worldwide to support Army, Navy, and Air Force tactical operations.

The DOD is continuing the development of a new, high-precision global navigation system called GPS to satisfy the military need for information on the location of force elements.

Navstar GPS will provide users with precise position information on a 24-hour global basis under all-weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all U.S. military forces. In addition to its primary function of improving United States and allied military forces' weapon delivery and target destruction capabilities, GPS has the potential to provide unique positioning and navigation services for civil and commercial interests on a worldwide basis as well.

GPS satellites will also play another extremely vital defense role by carrying the integrated operational nuclear detection systems, IONDS payloads. IONDS will provide real time strike and damage assessment information thereby enhancing strategic force management, a very important mission, I might add.

In the strategic defense area, the defense support program is one of the key elements of U.S. defense posture. The system utilizes satellites at synchronous orbit [deleted].

In fiscal year 1981 we initiated the acqusition of mobile ground terminals to enhance the survivability of this system. The fiscal year 1983 budget requests funds for the acquisition of two DSP satellites, and we will continue the survivability measures that have been instituted in the past year.

In the supporting areas, the DOD is investigating a wide range of space technology to maintain our current lead over the Soviet Union which is estimated to be anywhere from 5 to 10 years. Many of the technology based efforts such as lasers and communications are discussed in my statement for the record in some detail. The following are some of the highlights which I would like to offer to you as those which have considerable promise.

MISSILE SURVEILLANCE TECHNOLOGY

Several programs related to missile surveillance technology are developing sensors and collecting background data for application of infrared technology to surveillance and warning missions. Development of surveillance technology for infrared mosaic detector arrays, onboard signal processing, cryogenic refrigerators, large optics and structures in space continued in 1981. A new generation of detector arrays physically integrated with preprocessing electronics in a planar configuration was also tested.

Advanced microwave technology on miniature, low cost radar transceiver modules using integrated circuit technology is being pursued as well. The low cost, low weight and high efficiency of those modules are key factors in the feasibility for use in spaceborne radars as well as a variety of other phased array radar and communication applications in airborne and surface systems.

In the area of management of our space programs, DOD recently undertook an internal review of its space policy. This was felt to be necessary in order for the DOD to effectively plan the future course for the military use of space. This departmentwide study is chaired by the Under Secretary of Defense for Policy and is intended to produce a comprehensive DOD space policy to guide the conduct of the space activities in the Department. The DOD space policy will also serve as a frame of reference for the Department to address some of the issues being reviewed at the national level under the auspices of the Office of Science and Technology Policy in the White House.

The DOD space policy study is in its final stages, and we anticipate recommending that policy to the Secretary of Defense before the end of April.

Centralizing management of space activities within the DOD has been discussed from time to time over the past years and recently has received a lot of attention by senior management in the DOD and in the press.

Our organization for space has been evolving fairly rapidly over the past 4 years. Within the Office of the Secretary of Defense we have established a Space Operations Committee. The Air Force has established a Space Operations Steering Committee. It has formed a new Directorate of Space within the Deputy Chief of Staff for Plans and Operations at Air Force Headquarters and has designated Deputy Commander for Space Operations at Space Division in Los Angeles. In Dr. DeLauer's office, he has asked me to act as the principal focus for review of space research and development activities across all the mission areas. We will continue to evaluate organizational alternatives to effectively manage our space activities in the coming months.

As we move into the mid-1980's, this administration has drawn attention to the increasing rise of Soviet capabilities in space. This increase is not limited to the tactical and strategic warfare programs, but is also taking place in the research and development activities on which the space programs of the 1990's will be based. In order to meet the Soviet challenge, we in the executive branch must work with the Congress to insure the continued superiority of our national technological capabilities.

I would like to note that continuing technological advancement in space is dependent upon the availability of sufficient numbers of qualified scientists and engineers. The Department of Defense is currently looking into issues related to national shortages in specific scientific and engineering specialties in order to determine what impact national shortages, particularly in the engineering field, are having on our ability to recruit, retain and support scientific, engineering and technical personnel.

There is no area where this is more important than in the area of space technology. Proper support for our national science and technology programs not only enables the development of the systems we seek, but also serves to engender interest and to attract and retain the highly skilled personnel so vital to our national preeminence in astronautics.

I think this is a very important subject and would certainly solicit your help in these programs as well as in the broad area of our programs in space research and development.

Thank you very much.

[The prepared statement of Dr. Robert S. Cooper follows:]

PREPARED STATEMENT BY DR. ROBERT S. COOPER, DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am pleased to have this opportunity to appear before you this morning to review the space activities of the Department of Defense. In order to provide perspective for these programs, I will briefly discuss recent Soviet activities in space.

SOVIET SPACE ACTIVITIES

Soviet space activities continued at a high launch rate indicative of an expansion of capabilities in 1981. The Soviets attempted 100 launches—more than the 89 launches each in 1979 and 1980—and placed 124 payloads into orbit, exceeding the previous record of 118 set in 1978. We expect this high rate to continue through the

1980s with the advent of new systems and capabilities. [deleted] Development continues on [deleted] new space boosters, one in the Saturn V class [deleted] and large permanently manned space stations and complexes. [Deleted.]

[Deleted] The U.S. space shuttle can lift approximately 65,000 pounds into low earth orbit from Cape Kennedy. [Deleted.] Soviet military space capabilities include an anti-satellite system, effective against low altitude satellites, [deleted] ever expanding communication relay satellite systems to support Soviet ground, sea and air forces; and various [deleted] satellite networks for navigation, meteorological, [deleted] a significant feature of the Soviet program and one which has considerable military potential, is their manned program. This program consists of a space station, a space station module, and [deleted] for cosmonauts and equipment to support long-term manned missions. The trends and momentum of the Soviet program for 1981, as for the past 25 years, reflect a commitment to develop space capabilities that enhance and project military power. Now let me discuss some selected highlights and noteworthy developments during 1981. [Deleted.]

[Deleted.] Earth resources photography was accomplished by seven separate ERPHO missions in 1981, [deleted].

[Deleted.]

Salyut 6, a 42,000 pound space station, completed four years in orbit on 29 September 1981 and remains in orbit. Two cosmonauts, ferried on an improved Soyuz (Soyuz T-4) performed a 75-day mission beginning March 12, 1981. They were visited by two more missions, Soyuz-39 and Soyuz-40, with one Mongolian and one Romanian crew member aboard respectively. Progress 12 provided supplies, repair parts, and propellants to the space station. On June 19, 1981 the Soviets docked Cosmos 1267 to Salyut 6. This test was described as a test of rendezvous and docking and subsequent dynamics of two large space stations. According to the Soviets, Cosmos 1267-type vehicles will be used in the future as space station modules, each carrying equipment required for a particular mission. [deleted.] The events of 1981 certainly portend the advent of a new modular space station for the Soviets and move them well along the way towards the goal of a large permanently manned space station.

The Soviets launched four Molniya 1 and four Molniya 3 spacecraft in 1981 to maintain the communications satellite networks that support the [deleted.] They also successfully launched two Raduga geostationary communications satellites to provide civil and military communications relay. An Ekran satellite was launched to provide television broadcast to far east regions. The Soviets also registered additional satellites for deployment at geostationary altitudes in the 1980's, including two new geostationary data relay networks for the mid-1980's to provide data transmission to ground stations from low earth orbiting satellites via the geostationary relay spacecraft. [deleted.]

Meteorological satellite networks were maintained with three launches. The Soviets expanded Earth resources data collection capabilities with oceanographic satellites to collect and relay buoy data from the seas.

The Soviets launched two Venus probes, Venera 13 and Venera 14, in October and November resectively. Each probe included a vehicle for descent to the surface of Venus while the primary vehicle performed a fly-by. Both probes successfully performed their missions during the first week of March 1982. Four additional scientific satellites were orbited in cooperation with several countries for a variety of space exploration missions.

DEPARTMENT OF DEFENSE SPACE ACTIVITIES

Let me turn now to our own activities. Space activities of the Department of Defense are continuing to expand maintaining the trend of the past few years. Our military forces are becoming increasingly dependent upon space capabilities for communications, navigation, weather, and surveillance. As a result of space based capabilities, we find our forces are becoming more effective in achieving their assigned tasks. To insure that our space assets can support our military forces in the event of war, we are improving the survivability of future space systems. In fiscal year 1983 we have requested $8.5 billion for the Department of Defense space programs. This represents a real growth of 20 percent relative to the $6.4 billions appropriated in fiscal year 1982. Table I provides a breakout of these funds among our major programs.

TABLE I.—DOD SPACE AND SPACE-RELATED PROGRAMS

[In fiscal years and millions of dollars]

Program	1981	1982	1983
Mission oriented:			
Navigation	166.9	224.5	291.3
Communications	687.6	979.7	1,352.2
Warning	265.6	563.2	714.1
Mapping/charting/geodesy	11.6	29.2	53.1
Weather	86.5	114.3	235.9
Vehicle development	758.5	863.8	1,110.4
Space ground support [1]	315.2	433.4	557.6
Supporting R&D [2]	586.1	755.2	972.5
General support [3]	1,919.1	2,399.0	3,164.6
Total	4,797.1	6,362.3	8,451.7

[1] Includes range support, instrumentation, ground based satellite detection, tracking and control.
[2] Includes Research, Exploratory and Advanced Development.
[3] Includes support organizations as well as general operational support.

SPACE TRANSPORTATION SYSTEM

Truly significant space accomplishments of this past year were the successful flights of the space shuttle Columbia. Never before has a spacecraft demonstrated the capability to fly a second mission. This historic precedent marks a major event in the exploitation of space. No longer will space be only a place for experiments and operational platforms whose reliability relies exclusively on autonomous systems. The space shuttle provides the key for a sustained presence in space, as a working environment. The capability to deploy, retrieve, service, and repair operational platforms is at hand. These capabilities, when coupled with the shuttle's larger volume and payload capabilities, portend a transformation in our use of space. The emphasis now shifts from getting there to working and exploiting the space environment.

NASA has taken the lead in the development of the shuttle. We in the DOD have made a strong commitment to exploit the shuttle and its associated technologies in our future space planning, and we look forward to the routine operational availability of shuttle to enable full consideration of its unique capabilities to enhance our space operations. In addition, we have accepted responsibility for the development and operation of the shuttle launch site at Vandenberg Air Force Base for polar orbiting missions, for the development and production of the inertial upper stage (IUS) for use on both civil and DOD space missions, and the development of a number of shuttle related operational capabilities which will enable the DOD to fully exploit the shuttle. We are also providing 42 active duty military personnel as astronauts. When coupled with the four retired military astronauts, we observe that over 50 percent of the active astronaut cadre of 81 are from the DOD.

We believe that the present Space Shuttle orbiter production schedule is adequate to meet the projected requirements until the planned rate of 24 launches per year is reached in fiscal year 1988. However, there is concern over the adequacy of a four orbiter fleet. I believe that it is in the national interest to maintain the production capability for additional orbiters until the ultimate fleet size is determined. I believe this is best achieved by continuing with production of the fifth orbiter, and I support NASA's efforts to obtain funding for this endeavor.

MIXED FLEET

Both NASA and the DOD are investigating launch vehicle concepts to supplement our primary launch vehicle, the space shuttle. One concept under consideration is the so-called "big dumb booster", or SRB-X, that uses one or three solid rocket boosters, plus upper stages, to orbit up to 100,000 pounds. Another concept is the "in-line" launcher concept that uses a module with one or two main engines placed under the shuttle external tank and a large cargo placed atop the tank. These concepts are of interest because they would permit operation of a mixed fleet of space launchers that would make broader use of shuttle systems but not always require the shuttle orbiters which may not be able to meet all future demands for space transportation.

The Air Force is studying several vehicle concepts. New concepts and advanced technology designs will be studied under a program called the advanced military spaceflight capability. Primarily, we are looking toward a vehicle that could provide a significant increase in unique military capabilities including survivability. Emphasis is being given to such requirements as on-demand launch, use of conventional airfields, military mission capability, etc. The Air Force Space Division has initiated an effort to identify requirements, to determine what systems will be necessary, and to pinpoint specific technology which will be needed to support development of these systems.

As military data from space has become more essential, the requirement for a more responsive launch capability has become more critical.

Quick reaction launch, survivable launch, and reuseable aerodynamic space vehicles are examples of concepts which have been proposed to meet this need. Our proposed effort for the advanced military spaceflight capability (AMSC) programs includes research in those technologies which are critical to, and common to, the various AMSC vehicle concepts.

We believe that the nation needs an additional capability to complement the IUS capabilities and provide us an available option for higher performance in the future. A thorough assessment of the options which could provide that capability were examined last month. However, all the affordable available options resulted in an unacceptable level of risk for our defense launch capability. As a part of this assessment, we investigated Centaur and found that it would not provide for the potential defense payload requirements. We are therefore proceeding with NASA to develop a higher energy, second generation upper stage for future use.

We are also continuing work on the new consolidated Space Operations Center (CSOC). For management, operational, and economic efficiencies, CSOC combines two major space missions for DOD: Satellite control and space shuttle flight planning, readiness and command/control. In the role of satellite control, CSOC will enhance our operational capabilities by providing greater mission responsiveness. The satellite test center and CSOC will provide mutual emergency backup for mission essential functions should outages occur at either center. In its other role, CSOC will directly control DOD shuttle missions and enhance protection of national security information. Design of the satellite and shuttle control systems is underway and construction will start in 1983. Satellite operations will commence in late 1986 with CSOC functioning as an integral part of our worldwide satellite control network. Shuttle missions will be controlled from the CSOC starting in late 1987. CSOC will have a unique role in military space operations as we extend the military applications of the shuttle.

SPACE OPERATIONS CENTER (SPACE STATION)

The space operations center is a concept for a planned shuttle-serviced, continuously manned facility initially in low-Earth orbit. As envisioned by NASA, the space station would provide for the development, utilization and subsequent growth of orbital science and applications capabilities and support orbital operations such as the in-orbit assembly, launch, recovery, and servicing of manned and unmanned spacecraft; the construction, checkout, and transfer to operational orbit of large, complex space systems; and the tending of co-orbiting, free-flying satellites and platforms. It would also provide continuing development of the capability to conduct operations in space with progressively less dependence on Earth for control and resupply.

To support its human occupants, the space station would contain a habitation module incorporating a command center; crew quarters; food preparation, hygiene, and waste management facilities; exercise and recreation equipment; and a health maintenance facility with a small laboratory. A fully operational space station would require additional elements such as a logistics module, a flight support facility for servicing upper stages and co-orbiting satellites, a construction facility for fabricating large space systems, a propellant depot for storing propellants for reusable upper stages, and various research modules for scientific investigation.

The DOD is working closely with NASA in the definition of requirements for a space station. There are many potential military missions such as C31, surveillance, on-orbit servicing and maintenance of DOD satellites, R. & D., et cetera, that could possibly be performed from a manned space station. Our initial activity must be examination of the potential utility and cost-effectiveness of a space station to satisfy national security needs, pursuant to a determination of the extent of DOD support for NASA's program.

SPACE WEAPONS

The increasing capabilities of military space systems and the operating forces' reliance on them mark military satellites as attractive targets and underscores the importance of free access to space for our national systems. The Soviet Union's deployment of an operational antisatellite system demonstrates their understanding of that situation and provides additional rationale for DOD consideration of the role of space weapons. [Deleted.] We must [deleted] develop the means to deter an enemy from using antisatellite weapons against our military satellites. Furthermore, if deterrence fails, we must be able to protect our satellites using, if necessary, active satellite defense weapons.

[Deleted.]

In response to a Congressional request, DOD conducted a major review of the potential of space-based laser weapons which is documented in the 15 May 1981 DOD report to the Congress on space laser weapons. We concluded that space-based lasers offer military potential in a number of applications, but we are uncertain of our ability to predict with confidence their ultimate utility. Accordingly, we have established a $50/million year augmentation to our space based laser program beginning in fiscal year 1983, to more aggressively pursue resolution of uncertainties. The program will be initiated in fiscal year 1982 using funds specifically appropriated (but not authorized) by the Congress to begin the work. The DARPA portion of the additional funding will be used to accelerate technology development for short wavelength lasers which, if successful, have the potential of permitting the use of smaller diameter optics for an equivalent ability to focus the laser spot onto a target at long range. The Air Force portion of the additional funding will be used to address overall system and utility issues, to include survivability, total system architecture (e.g., surveillance, command and control), and Soviet ability to harden potential targets.

SPACE-BASED LASER COMMUNICATIONS

A joint DARPA/Navy submarine laser communications (SLC) program is developing the technology to communicate from space, using blue-green laser light, to submarines at operational depths with minimal impact on their natural covertness and flexibility. Early tactical SLC capabilities are expected from an airborne system to limited areas. A space-based SLC system might provide for global coverage, survivability, and flexibility in both tactical and strategic operations. The SLC program is investigating systems concepts and advancing device and optics technology for communication to submarines at operating depths that would use laser beams from a satellite in the blue-green spectrum. In early 1981 technology advances inoptical receivers permitted an experimental verfication of SLC communications from aircraft through clouds and water to a submerged submarine. While not an operational demonstration, this test served to validate performance predictions.

SATELLITE COMMUNICATIONS

In the area of military satellite communications systems, we have spent a year and a half on a joint effort with all the services and agencies involved to define a new MILSATCOM architecture. This architecture relates combat and combat support needs to near, mid, and far term MILSATCOM systems in the presence of the ever growing Soviet threat. The heart of the architecture is MILSTAR, a system to provide survivable and enduring, jam-resistant communications to small and mobile terminals of the strategic and tactical forces. A joint program office has been established at the Air Force's space division where system definition efforts are under way. [Deleted.] We anticipate the DSCS III satellite program will continue to provide its unique and vital services throughout the 1980s. We are asking for funds to continue the acquisition of three additional FLTSATCOM satellites to ensure we do not have a strategic communications gap until the MILSTAR system is sufficiently operational.

We will continue the LEASAT program to support our tactical forces and general purpose mobile users. We intend to pursue a vigorous R. & D. program to ensure our MILSATCOM systems have the necessary attributes to support our war fighting forces throughout the spectrum of conflict. MILSATCOM is composed of elements supporting strategic, tactical, and long-haul communication users.

AFSATCOM was conceived as an evolutionary SATCOM system to provide the national command authorities (NCA) and CINCS with worldwide secure, survivable communications for command and control of the nuclear capable forces. The initial phase, AFSATCOM I, achieved IOC in 1979 and provides essentially worldwide coverage with a modest antijam capability. The space segment consists of transponders on polar orbiting satellite data system satellites, geostationary FLTSATCOM satellites and other host satellites. The earth segment consists of a family of terminals installed in the large command centers serving the NCA and the CINCS bomber/reconnaissance/command post/Tacamo aircraft, and the ICBM Launch Control Centers. The system handles low-speed teletype messages for emergency action message dissemination, NCA/Cinc internetting, force direction, and force reportback.

The AFSATCOM I system is being augmented by the incorporation of Single-Channel Transponders (SCT) into the DSCS III spacecraft. Increased jam resistance is achieved [deleted] survivability against physical attack is also enhanced through proliferation. In addition plans [deleted] are being evaluated for cost-effectiveness.

While the AFSATCOM I UHF system represents a significant increase in capability insofar as connectivity, coverage and reliability are concerned, an increasing threat dictates that vulnerabilities in the current system be eliminated. MILSTAR is the next generation MILSATCOM system which will provide a survivable and enduring warfighting communications capability into the next century.

The Defense Satellite Communication System (DSCS) is a high capacity, Super-High Frequency (SHF) system to satisfy the unique and vital national security communications requirements for worldwide military command and control, intelligence information transfer and crisis management. The DSCS supports telecommunications needs of the Worldwide Military Command and Control System (WWMCCS), the National Command Authorities (NCA), the Ground Mobile Forces (GMF), the Diplomatic Telecommunications System (DTS), the Defense Communications System (DCS), and selected allies.

In December 1976, the Defense Systems Acquisition Review Council (DSARC) authorized full scale development of the DSCS III satellite. In February 1977, a contract was awarded to complete satellite design, develop, test and support the launch of two DSCS III Demonstration Flight Satellites (DFS); develop a refurbishable qualification model satellite; and conduct on-orbit demonstrations. Also, subsystems engineering development model Satellite Configuration Control Elements (SCCE), which allow control of DSCS III satellites are under development. The launch of the first DFS with a DSCS II satellite is planned for September 1982 on a Titan III (34)D/IUS launch vehicle. A second DFS will be available for launch in mid 1983 also paired with a DSCS II satellite. A DepSecDef decision to proceed with full production of two DSCS III satellites in fiscal year 1982 was made in January 1982. The fiscal year 1983 request contains funding for two additional DSCS III spacecraft.

DSCS terminal procurement continues on schedule. The last of the 18 large AN/MSC-78 terminals equipped with 60-foot parabolic antennas became operational in March 1978. In mid-1978, new contracts were awarded for the Medium Terminal (MT) equipped with a 38-foot parabolic antenna and the AN/USC-28 antijam communications equipment. In September 1979, the Army awarded a contract for 225 ground mobile forces terminals to support Army tactical operations. These terminals will be equipped with an antijam modem and are highly transportable. The contract for procurement of 32 transportable jam resistant secure communications terminals was awarded in 1981. These terminals will provide a sensor data network, fixed and executing command networks and secure voice/graphics conferencing for tactical warning and attack assessment (TW/AA) and command and control functions.

FLTSATCOM is a UHF satellite communications system which significantly improves naval communications to meet the needs of the fleet in the 1980s. The system consists of four geostationary satellites now on orbit which provide virtually worldwide coverage for fleet operations. [Deleted.]

[Deleted] the Navy is developing a family of information exchange subsystems to provide automated traffic and access control over the communications channels. Advanced control equipment is being developed to implement demand assigned multiple access (DAMA) techniques to improve channel utilization. All ships are now equipped to receive the FLTSATCOM fleet broadcast and over 340 vessels have a transmit capability.

As a result of damage incurred during launch, satellite number five (planned as an on-orbit spare) is operationally unusable. To provide continuity of service for both FLTSAT and AFSAT users, three additional satellites are being procured to be available for launch beginning in 1985. A small EHF FLTSAT test package will be deployed on FLTSATS 7 and possible 8 to reduce technical risk and to provide a means to conduct technical and operational evaluation testing of engineering development EHF satellite terminals.

In response to congressional direction, DOD issued a contract in October 1978 for a Leased Satellite system (LEASAT) to follow the FLTSATCOM program. A four operational satellite constellation is planned to provide worldwide leased UHF satellite service. System IOC is linked to the Space Shuttle schedule since the spacecraft configuration is incompatible with expendable launch vehicle dimensional constraints. The capacity of the leased satellite system is substantially less than that of FLTSATCOM and has no jam resistance. The reduced capacity was necessary in order to provide a simple satellite design that could be obtained by leasing. LEASAT service will begin in 1984 and could extend into the 1990s.

The MILSTAR system is a new, highly survivable and enduring Satellite Communications (SATCOM) system. This new system will provide high capacity, worldwide, jam-resistant communications for our strategic and tactical forces. Principal users of MILSTAR will be the strategic nuclear-capable forces, the Navy, and tactical ground mobile forces of the Army, the Marine Corps, and the Air Force. Missions to be supported include Emergency Action Message (EAM) dissemination, strategic force management, Cinc internetting, fleet operations, and tactical communications for mobile forces.

The baseline MILSTAR constellation will consist of five geosynchronous satellites (four operational and one spare) and three polar-orbit satellites. The seven operational MILSTAR satellites will provide communications service to all areas of the Earth exclusive of the south polar region. [Deleted.] The UHF channels will be used to ease transition and provide continuity of service with terminals now serving strategic and selected tactical forces. The UHF channels will be interconnected with the EHF channels to enable consolidation of all MILSTAR crosslink and downlink information.

The terminal segment of the MILSTAR system consists of terminals located on aircraft, ships, submarines, jeeps, armored track vehicles, and at fixed terrestrial sites. There are two classes of EHF terminals: User communications terminals which provide communications capability only, and control element terminals which provide satellite payload and system control capabilities as well as communications capability.

MILSTAR design will incorporate both electronic and physical survivability features to counter jamming and ASAT threats postulated for the 1980's and 1990's. [Deleted.] Operation in the extremely high frequency (EHF) band will provide [deleted] jam-resistance, [deleted] and protection against nuclear effects [deleted].

The system definition and design phase will conclude in October 1982 and full scale development is expected to provide an initial capability [deleted] funding to begin the MILSTAR is included in the fiscal year 1983 budget request.

Although the new DSCS III satellite, to be launced in the fall of 1982, will provide jam resistance for some critical users such as the tactical warning and the ground mobile forces.

METEOROLOGY

The Defense Meteorological Satellite Program [DMSP] supports DOD needs for weather information. Its operational requirements dictate the use of at least two satellites continuously in orbit, obtaining weather information from all points on the Earth at least four times each day. Global weather data is stored on the satellites and later transmitted to the Air Force Global Weather Central or to the Navy Fleet Numerical Oceanography Center. Regional weather data is also transmitted in real time to transportable read-out stations at key locations worldwide to support Army, Navy and Air Force tactical operations.

NAVIGATION

The DOD is continuing the development of the NAVSTAR Global Positioning System [GPS] to satisfy the military need for information on the location of force elements. NAVSTAR GPS will provide users with precise position information on a 24-hour, global basis under all weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all U.S. military forces. In addition to its primary function of improving United States and allied military forces' weapon delivery and target destruction capabilities, GPS has the potential to provide unique positioning and navigation services to civil and commercial interests on a worldwide basis. GPS satellites will also play another extremely vital defense role by carrying the Integrated Operational Nuclear Detection System [IONDS] payloads. IONDS will provide real-time strike and damage assessment information, thereby enhancing strategic force management.

In virtually all tests to date the GPS prototype equipments have met or exceeded expectations. During 1982, therefore, we are finalizing our plans to initiate procurement of the operational satellites and continuing full scale development of both the ground control segment and the user equipment. Continuation of our ongoing efforts will lead to the establishment of a worldwide, highly accurate, three-dimensional positioning and navigation capability by 1988.

OCEAN SURFACE SURVEILLANCE AND TARGETING

Continuing evaluation of the threat and fleet operations has shown that none of the Navy's operational surveillance systems provides the full range and depth of information required by tactical commanders. In the mid to late 1970's, the Navy examined the possibility of filling this need with an ocean surveillance active radar satellite. System validation studies proved the value and technical feasibility of the concept; however, the proposed radar satellite provided no capability to detect and track high-speed aircraft. Given a constrained budget and the system's projected high development cost but relatively low tactical utility, the Navy decided not to proceed to advanced development. Nevertheless, the Navy recognized the potential of an active space based sensor to satisfy its offensive and defensive needs. Accordingly, a detailed assessment of needs and system alternatives was undertaken, leading to initiation of concept exploration studies for the Integrated Tactical Surveillance System [ITSS] in November 1980. [Deleted.] The concept exploration studies will lead to more explicit needs definition and will provide the information on which the Navy will base decisions on the future development of ITSS.

ITSS, as an evolving system, will be built on several existing programs. In those cases where existing capabilities are found to be deficient, upgrades and/or new system developments will be initiated. Upgrades will provide near-term system improvements while needed new capabilities are under development.

A key issue in ITSS concept exploration is whether there is need for development of an active space based sensor. Passive sensors (E.g., electro optical) do not provide worldwide, all-weather, day-night surveillance. An active sensor of some type is an essential element of the ITSS and can potentially satisfy more than just Navy requirements. During concept exploration, the Navy will validate the need for an active sensor and evaluate alternative systems, [deleted].

The information handling and dissemination components of ITSS will include a significant part of the [deleted]. The other services are involved in the ITSS program through participation in monthly working level meetings to discuss ITSS development issues and quarterly summary reviews of the concept exploration studies. The Air Force applied funds to the concept studies to examine various aspects of ITSS applicability to satisfying their Conus atmospheric tactical warning requirements.

The concept exploration studies were completed in February 1982 and are being evaluated by the Navy. A DSARC–I tentatively is scheduled for the June 1982 timeframe. Because of a desire to examine the ITSS concept more closely before proceeding to advanced development, Congress limited the program's funds to $12.3 million in fiscal year 1982, to allow completion of the concept exploration studies. The Navy budget requests $16.9 million for ITSS in fiscal year 1983.

STRATEGIC DEFENSE SYSTEMS

The Defense Support Program [DSP] is one of the key elements of the U.S. defense posture. The system utilizes satellites at synchronous orbit [deleted]. In fiscal year 1981 we initiated the acquisition of [deleted] the Simplified Processing Station [SPS] [deleted] will be redeployed overseas late in 1982 to improve system reliability. In fiscal year 1982 we initiated the procurement of long lead items for additional satellites to maintain the space segment. The fiscal year 1983 budget requests funds for the acquisition of two DSP satellites.

The development of the Integrated Operational Nudets Detection System [IONDS] is being pursued by the Air Force. IONDS is being developed to provide a capability to detect, locate and report in near real time nuclear detonations on a global basis. The plan for the program is to provide funds to place sensors on NAVSTAR Global Positioning System [GPS] satellites and for ground readout and display equipment for several users, such as the national command authorities, commanders of theaters and unified/specified commands, and other users as may be designated.

SUPPORTING SCIENCE AND TECHNOLOGY

The DOD is investigating a wide range of space technology to maintain our present lead, estimated to be 5 to 10 years, over the Soviets in selected areas. Many of these technology base efforts, such as lasers and communications, are highlighted elsewhere in this statement. The following are some of the others which offer considerable promise.

Several programs related to missile surveillance technology are developing sensors and collecting background data for application of infrared [IR] technology to surveillance and warning missions. In missile surveillance technology, new infrared measurement hardware was purchased during 1981 to improve the accuracy and effectiveness. Rocket and balloon flights are planned for 1982. Infrared data on Earth backgrounds and rocket engine plumes will provide a major contribution to system design considerations for a space based missile surveillance system. In space surveillance technology, the space infrared sensor, precursor to a space-based surveillance system, was completed and awaits a decision to launch. Two IR background measurement probes were launched successfully in 1981.

The Navy, Air Force and Defense Advanced Research Projects Agency [DARPA] in 1981 accelerated development of critical technologies supporting advanced concepts and technology for strategic and tactical surveillance from space. Programs possibly leading to demonstration of these technologies in a system level proof-of-concept experiment for improved mission performance are continuing.

Development of surveilliance technology for infrared mosaic detector arrays, onboard signal processing, cryogenic refrigerators, large optics, and structures continued in 1981. A new generation of detector arrays. physically integrated with preprocessing electronics in planar configuration, was tested. The breadboard model of lightweight, large-date-capacity, onboard processor was successfully demonstrated against real target and background data from the hi-camp airborne imaging spectroradiometer. [Deleted] quantity production of teal ruby mosaic chips using the fully automated cryogenic test set was performance-qualified. DARPA completed the system requirement review of the advanced sensor demonstration program to demonstrate advanced surveillance missions and the technology base developed to support them. Technology development continued for key components and concepts for space-based radar, including transceiver modules, larges lightweight phased array antenna structures, and onboard signal processing components, DARPA continued design and analysis for the Talon Gold experiment to develop space technologies for precision acquistion, tracking and pointing at long range.

The cryogenic infrared radiance instrumentation for Shuttle [CIRRIS] will examine Earth limb/atmospheric backgrounds for an increasing number of systems applications using infrared technology as well as studing a number of Shuttle payload contamination issues, the CIRRIS payload was integrated with the shuttle experiments support system in 1981 and will be flown [deleted].

Advance microwave technology on miniature, low cost radar transceiver modules using integrated circuit technology is being pursued. Low cost/weight and high efficency of the modules are key factors in feasibility for use in space-borne radars as well as a variety of other phased array radar and communication applications in airborne and surface systems. A silicon-on-sapphire mosfet power amplifier has been demonstrated, improved designs for low noise amplifiers, phase shifters and passive transmit/receive switches will soon be evaluated, fabrication and testing of fully integrated modulea area planned for late-1982, similar critical components in Gallium Arsenide technology have been demonstrated and improved designs will be evaluated in 1982 work has continued to demonstrate antenna pattern performance of candidate space-borne, phased-array radar membrane structures.

MANAGEMENT OF SPACE PROGRAM

Due to the similar nature of the work performed by NASA and DOD, it is clearly in our mutual best interest to cooperate extensively in many endeavoars. This cooperation manifests itself primarily through the many jointly manned research and operational facilities which conduct space technology research. In addition, senior management maintains oversight for our common interests through the Aeronautics and Astrouautics Coopdinating Board [AACB]. The AACB, cochaired by Dr. Hans Mark Deputy Administrator of NASA., and Dr. Richard D. Delauer, Under Secretary of Defense for research and Engineering, meets periodically to review programs of mutual interest and develop plans for our future programs. The Board met just this past month to review the status of the space transportation system. Technical interchange is assured through the many standing panels of the AACB along with numerous working groups which are formed to address specific issues.

The DOD has undertaken an internal review of its space policy. This was felt to be necessary in order for the DOD to effectively plan the future course for the military use of space. This departmentwide study is chaired by the USD(P) and is intended to produce a comprehensive DOD-space policy to guide the conduct of the space activities of the department. The DOD space policy will also serve as a frame of reference for the department to address some of the issues being reviewed in the national space policy review under the auspices of the Office of Science and Technology Policy.

In establishing the basis for the new DOD space policy, careful consideration is being given to [deleted] treaties and international agreements impacting the use of outer space, [deleted] the body of existing U.S. space laws and policy, [deleted] the DOD space policy study is in its final stages and we anticipate recommending the policy to the Secretary of Defense before the end of April.

The DOD has been participating in Dr. Keyworth's national space policy review, [Deleted].

The centralizing management of space activities within the DOD, has been discussed for some time. Recently a bill has been introduced in the house (H.R. 5130) which directs the Secretary of the Air Force to report to Congress on the feasibility and desirability of establishing a separate command for space. Our organization for space has been evolving fairly rapidly over the past 4 years. Within the Office of the Secretary of Defense we have established the Defense Space Operations Committee. The Air Force has established a space operations steering committee; formed a new directorate of space within the deputy chief of staff, plans and operations at headquarters air force, and has designated the deputy commander for space operations at space division in Los Angeles. In Dr. DeLauer's office, he has asked me to act as the principal focus for review of space research and development across all mission areas. All these organizational changes were made to sharpen our focus for space activities and bring increased management attention to this important area. We will continue to evaluate organizational alternatives to effectively manage our space activities.

CONCLUDING REMARKS

As we move into the mid-1980's, this administration has drawn attention to the increasing rise in Soviet capabilities. This rise is not limited to the tactical and strategic warfare programs, but also is taking place in the research and development activities on which the space programs of the 1990's will be based. In order to meet the Soviet challenge, we in the executive branch must work with the Congress to insure the continued superiority of our national technological capabilities.

I would note that continuing technological advancement in space is dependent on the availability of sufficient numbers of qualified scientists and engineers. The Department of Defense is currently looking into issues related to national shortages in specific scientific and engineering specialties in order to determine what impact national shortages, particularly in the engineering field, are having on our ability to recruit, retain and support scientific, engineering and technical personnel.

Among the areas we are concerned about are: Current shortages of PH. D. engineers, particularly the estimated 10 percent faculty vacancy rate in our Nation's engineering schools; the large number of foreign nationals taking advanced degrees as contrasted with the small number of U.S. citizens pursuing a graduate education; the inadequancy of university facilities and equipment for teaching and research; the quality of elementary and secondary education and our current ability to equip our youngsters to pursue the rigorous course of study demanded by scientific and engineering disciplines; and the ability of the public sector, and particularly such agencies as defense, to compete effectively for scarce scientific and engineering manpower when private sector salaries and other benefits outstrip those of the civil service by more than a factor of two in many cases.

Future advancement in science and technology cannot be made without first insuring that we have the people to make them.

Proper support for our national science and technology programs not only enables the development of systems we seek but also serves to engender interest and attract and retain the highly skilled personnel so vital to our national preeminence in astronautics.

Parochially speaking, I view this support as critical to our national security.

I, therefore, encourage your full support for our space programs, recognizing our common goals in preserving U.S. technological excellance.

Senator **Warner** [presiding]. We thank you.

I am quite anxious to get as much material into the public domain as possible about our program, and I have been going through your statement. You have a mixture of secret and unclassified material here.

Dr. **Cooper**. Senator Warner, I think there are classified aspects on many of the pages in this summary statement, but we have prepared a declassified version of that which we will submit to you and which is really a very minor modification on the statement which I have just made.

Senator **Warner**. OK. I am sure that other colleagues share this feeling with me.

I wonder if you could get that to us as quickly as possible because so much important material is conducted by the Department of Defense in the area of space and the need for the funding for space related activities is great and growing. You know, I am afraid the American public, as Senator Exon has said many times, is focused on the manuals used by the Department of the Army at eighth grade level, the M-1 tank and so forth, but we get lost, you know. We are just focusing on these little things, and you are doing this vital work, you need the funding, and here we are talking about cuts in the Congress. Somehow we have got to do a better salesmanship job on what is being done at your end because this relates to young people. Young people are dramatically interested in space; and therein is one of our weakest constituencies nationwide in terms of support for Defense programs.

I need help in communicating to the American people the importance of your program.

Do you share that, Senator Exon?

Senator **Exon**. I certainly do, Mr. Chairman, and I think when we are talking about support for the overall national defense effort, there are always going to be differences of opinion on what we should spend money on, tanks, airplanes, and so forth and so on. But I think generally speaking the area that you are in is of overall concern that the people would like to know a little bit more about, because what we are really talking about is the fact that I think we have all looked forward to the time when we hopefully would be the ones that would have a major, major breakthrough in a whole series of areas in which you are involved, and I would certainly agree with the chairman. If we could get a little more of this kind of information out, I would suspect that most people would be more interested in seeing money going into these programs if we have some chance of success than even something like the M-1 tank.

Senator **Warner**. I share that view, Senator.

Senator Quayle, do you have any questions that you would like to lead off with?

Senator **Quayle**. Yes; I arrived late, Mr. Chairman. I just——

Senator **Warner**. Well, if I may interrupt, I indicated to our witnesses beginning at 8 o'clock this morning that the Senate has been on a most erratic schedule, and our colleagues in the Senate are having an extremely difficult time trying to get their work done with certain constraints that we have on us at this point.

We appreciate the indulgence of the witnesses, and we regret the absence of so many of the members.

Senator **Quayle**. We appreciate our chairman's work. He arrives early, conducts the hearings, and obtains all the information for the committee which we can read, and then we can ask him on the floor, during all these important votes, exactly how we ought to be proceeding.

GPS PROGRAM

My question—and it has been an area I have been interested in for a long time, and I suppose General Randolph would be in the best position to respond—how high priority are we really giving the GPS? I keep hearing rhetoric that it is a high priority, but that is about all I get.

Now, are we really serious about this program? How important is it? It seems to me, if we are looking at communications and navigation as the way of the future, that GPS ought to be one of the major programs that the Air Force, the Navy and DOD in general ought to be promoting. But it seems that when we get around to the testimony and discussion on GPS that it just receives passing attention.

I wonder if you might be able to profile the GPS program for me.

General RANDOLPH. OK. First of all, the program is a very high priority. The Air Force Chief of Staff has gone on record as saying, "this is a critical program in terms of the priorities that the Strategic Air Command has and they are one of the primary users. It is a very high priority program in the baseline program." The program will provide a capability that far exceeds anything that we have right now, and one of the criticisms in the past has been that this is not a warfighting system. The facts are that it is. Our analysis shows that there is a potential cost avoidance of some $50 billion in weapons by virtue of increased effectiveness and efficiency of our bombing capability by having such accurate navigation information. Our testing has shown that we can drop bombs—these are dumb bombs, not smart bombs—from our fighters and bombers to accuracies less than the size of this room, consistently. The accuracy capability that is advertised overall better than 90 percent of the time for the GPS is, as I am sure you know, Senator is a vast improvement. One analysis shows the fact that in the first 10 days of a Warsaw Pact-NATO conflict, we can actually destroy [deleted] percent more targets by virtue of increased accuracy and increased efficiency by virtue of having GPS. We can conduct landings under blind flying conditions without the assistance of any other navigation aids.

The facts are that the operation of this system, once it is established, will be about comparable to those ground navigation aids that we have right now. So, therefore, we will be able to replace those ground navigation aids, continue with much better capability and the operations and maintenance of the system will be approximately the same cost.

So I guess the bottom line answer is, first of all, it is a high-priority program; second, it is a program that provides tremendous combat capability; and further, of course, it is a program which carries the NUDET detection capability that we need for force management.

Now, that particular capability is very critical for the force management in the sense of making efficient use of our forces. We are able, with the GPS fully deployed, and with the so-called IONDS, the NUDET detection capability onboard, to be able to detect nuclear detonations within 100 meters. So, therefore, when we try to destroy hard targets in the Soviet Union, we are able to demonstrate or to understand our success in destroying those hard targets and, therefore, not have to go back and restrike those targets, and we can retarget in near real time.

So I think in the total sense, it is a war-fighting capability, it is extremely capable, it is in fact a revolutionary capability as far as navigation and bombing are concerned.

Senator **Quayle**. Now, in the 1982 appropriations I believe that there was a zero amount——

AMERICAN AND SOVIET SPACE COMPARABILITY

Senator **Warner**. Senator Quayle, if I could interrupt, Dr. Cooper has to leave at 12 and I am wondering, Senator Exon, you put forth in the last session a very pertinent question about the comparability between American and Soviet space activities. While he is here for the remaining 5 minutes, would you like to restate that question to this panel?

Senator **Exon**. Thank you, Mr. Chairman.

Dr. Cooper, I guess we would just like to have your comment on what you view at the present time as the percentage of probability of whether we are ahead of the Soviets in the overall space technology, where do you think we are going to be a year from now, where do you think we are going to be 5 years from now, where were we yesterday in comparison to the Soviet Union to a major breakthrough in the whole area of space technology and laser weaponry in particular.

Dr. **Cooper**. I would be happy to respond to that, Senator. I think that we clearly are ahead of the Soviets in overall space technology, and that lead really represents some of the essential differences in the leverage that we have in our smaller numerical numbers of ground forces. It largely has to do with the ability that we have to make microelectronic circuitry and to employ technologies in spacecraft that last much longer in space than Soviet spacecraft and are much smarter in many senses.

SPACE WEAPONRY

The question of space weaponry, though, is a different situation entirely. It is one that is highly speculative [deleted]. We do know that they have a moderate capability antisatellite system which they can deploy into low Earth orbit and which does threaten our low Earth orbiting satellites. [Deleted.]

There are those who feel that the Soviets may be interested and may be pursuing putting laser weapons in space in the near future, and there we are into a very, very speculative area. [Deleted] but the argument can be made that they appear [deleted] to be spending an enormous amount of their technological resources on developing high energy laser weaponry generally. The estimates have been that they are spending anywhere from three to five times the expenditure rate that we are spending overall in our laser weaponry.

Now, you will notice from the submissions in the President's fiscal year 1983 budget that in our programs we are spending about one-third, in fiscal year 1983, of our budget request on space-based laser weaponry in the overall high energy laser program. The overall request is about $433 million for fiscal year 1983, and we will be devoting just about $150 million of that total to the space-based laser weapon program.

Now, the reasoning on the Soviets goes roughly as follows: We know the Soviets are spending heavily, perhaps three to five times as much as we are. Pick a number. Say it is four times what we are spending. [Deleted.]

OK, now, when would we expect at our current rate of expenditure to be able to do that? My guess would be that the earliest time we could expect to do that would be in the early 1990's with a demonstration system. If you believe that the Soviets are ahead of us by this reasoning that I have just outlined to you, then you could expect that the Soviets at least would have the opportunity, the technological opportunity from the results of their research, to field space-based laser weapons sooner than the early 1990's.

But how much sooner than that is a matter of speculation, and I would say that [deleted] certainly among the senior managers in the Defense Department, there is a great deal of variance in belief as to exactly when that might be.

Personally, I feel that the opportunity probably exists for the Soviets to test something of that sort in the [deleted], but that is speculation. There may be an error in that assessment by as much as 5 years either way.

Senator **Warner**. On that point, didn't we hear [deleted] as the possible one today, in previous testimony, [deleted].

Dr. **Cooper**. Sir, that is not at variance with my assessment which is the [deleted] with 5 years uncertainty.

Now, it is the great uncertainty in our ability to estimate what the Soviets can do and what their intent is that places that great uncertainty in what they might do.

Senator **Exon**. I guess, if I could just come back to the situation, when you are involved in a race you have got to figure where people are starting from, and that is why I would like to have you elaborate a litte bit more, if you could, on where do you think we are right now? If we assume we are going to start the race tomorrow, where are we today with respect to them? The company has done pretty well with Atari games, you know, they are doing pretty well. Suppose you and I would form a company today to go into competition with Atari, if we could spend 25 times as much money as Atari is on research, and we probably would not be able to market a product for Christmas 5 years from now.

So I guess what I am trying to say is, Where are we now? And that gives us some indication as to how fast we have to move.

You said earlier in your statement in response to my question that we were obviously ahead of the Soviets in general space technology.

Are you not certain as to how we stand with them at the present time on offensive laser technology and weapons?

Dr. **Cooper**. That is correct, [deleted]. We can say with certainty where we are today, and I would like to point out that we have a very solid, well-based, well-founded program in laser technology, and that technology is going about as fast as I believe it can go. It is limited by not enough smart people and ideas in the program. It is probably not limited substantially by funding because of the recent funding actions we have taken. We believe that we are on a course to be able to have enabling technology available in the [deleted] which would place our first opportunity to test something in space about 5 years beyond that.

Typically, it will take a 5-year period from the time you have the technology well in hand until you can demonstrate something in space.

Senator **Exon**. Thank you.

Thank you, Mr. Chairman.

Senator **Warner**. Do you have any follow-up questions, because Senators are expected to be in their seats in 22 minutes, and Dr. Cooper is expected to save the world in six in some way.

I am apologetic to our witnesses. This is a most unsatisfactory way in which we have conducted our meetings, but it has got to be done. I apologize to you and we will just have to submit questions.

Senator **Quayle**. I do want to follow up one thing with General Randolph.

Senator **Warner**. But Dr. Cooper has got to leave.

Dr. **Cooper**. I do have to excuse myself.

GPS PROGRAM

Senator **Quayle**. I have one thing to follow up on GPS.

Senator **Warner**. Would you adjourn the hearing when you are through?

Thank you very much, gentlemen.

Senator **Quayle** [presiding]. Given the high priority, which I certainly subscribe to on GPS, appropriations in 1982 put a zero amount in procurement.

Now, then, where are we on reprograming the money for 1982 so we can put our money where our priorities are?

General **Randolph**. We have a reprograming package which has just been signed out of the Air Force today to go down to OSD for final approval to come over to the Congress. That reprograming package will request $20 million of reprograming in fiscal year 1982, and in view of the late time in the fiscal year and the approach which we propose to take in acquiring those satellites, that is about the most that we can prudently use this fiscal year.

As you recall, the request last fiscal year was $76 million, but that was basically assuming that we would be able to start much earlier than we are this fiscal year.

In addition to that, if you recall the Senate language, the authorization committee suggested that we use a block buy, and we are proposing to initiate a block buy with that $20 million.

Senator **Quayle**. In view of the fact that last year it was what, $75 million.

General **Randolph**. It was $76 million last year.

Senator **Quayle**. $76 million, and the reprograming package calls for, you say, $20 million which is less than a third, some of the critics of GPS, I can hear them right now saying, well, this request just underscores that it is not very much of priority, and is this really adequate to put GPS in its proper perspective that you indicate that it should have?

General **Randolph**. Yes, sir, because the approach that we are taking, as suggested by this committee, is to use the block buy approach. If we do that, there are two things that will occur. First of all, over the block buy of the 28 satellites we will avoid a cost of $300 million. Second, the block buy approach funds to termination liability. Therefore, the outlays required are less initally until the program begins to build up.

The profile that we have described for you will get the statellites on orbit with a 2-dimensional capability in 1986 and a 3-dimensional capability in 1988, and the full 18 satellite constellation by 1988 as was previously the position of the Air Force.

So, the answer to the critics is that we are moving forward on an aggressive program that provides for the delivery of the satellites at approximately the same period of time as we had envisioned earlier, and simply by virtue of the different approach in buying the satellites, there is less necessity for outlays of the amount that we originally requested.

Now, if we go back to an annual buy whereby we are fully funded and buy on an annual basis, that increases the cost, and slows down the delivery.

Senator **Quayle**. Staff brings up a good point.

Can you go ahead with the multiyear purchase without congressional consent?

General **Randolph**. No, sir, that is part——

Senator **Quayle**. Do you need it?

General **Randolph**. Yes, sir.

Senator **Quayle**. Are you going to request it?

General **Randolph**. In fact, that is part of the reprograming.

Senator **Quayle**. That is part of the reprograming?

General **Randolph**. That's correct.

Now, I should point out the technicalities. As I understand it, we have technically the legal authority to do that. However, that has been a prerogative reserved for the Congress, and so the Department of Defense position is that we present our case to the Congress and gain your approval before we proceed with that procedure, and that is part of the reprograming request.

Senator **Quayle**. How do you answer the critics of GPS who say that the system is vulnerable, soft?

General **Randolph**. The spacecraft we plan to place on orbit are in six planes at 11,000 nautical miles altitude. Each of the spacecraft in a plane is about 8,000 miles away from the other spacecraft. So, the kind of thing that you would need to destroy those spacecraft is a fairly complex attack, and let me just describe on scenario that I have heard.

If you want to attack the spacecraft with a conventional type weapon which the Soviets have demonstrated at low altitude, you need [deleted]. You add all that up and you begin to see that the destruction of individual satellites may be possible, but the destruction of the constellation would take a rather significantly long period of time. That's point one.

Point 2, we are not dismissing the threat as being trivial. It is in fact there, and it is real. We have in the President's 5-year defense plan approximately $300 million to help improve the survivability of GPS. The addition of cross-linking, the addition of hardening, nuclear hardening and [deleted] hardening in the event that the Soviets do deploy [deleted] and of course, the possibility of adding more satellites to have a more robust capability on orbit. All of those things are being examined as part of the program.

Again, the bottom line is that the constellation would not be vulnerable when deployed, and we are taking steps to make sure that it does not become vulnerable as it remains on orbit.

Senator **Quayle**. When is the IOC of GPS?

General **Randolph**. In 1986 for the two-dimensional capability.

Senator **Quayle**. Senator Exon, do you have anything else?

Senator **Exon**. No, I don't.

Senator **Quayle**. Do you want to make any concluding remarks?

General **Randolph**. Let me just mention one thing.

Those who talk about the vulnerability of spacecraft are thinking in terms of single spacecraft. I will have to say the destruction of spacecraft on orbit in a system sense is a very difficult task and should not be taken as something that is very easy to accomplish.

Senator **Quayle**. Senator Exon, I am going to leave this meeting to you. General Lamberson wants to make some few concluding remarks, if that is all right.

Is that agreeable to you?

Senator **Exon**. Certainly, Dan. I will be glad to stay here because I want to get this testimony in the record.

Senator **Quayle**. Yes; I know you are very interested in it, but I have to leave. Thank you.

Senator **Exon** [presiding]. Thank you.

General, why don't you proceed?

General **Lamberson**. Thank you very much, Senator.

I am honored to testify with a short statement for you today in anticipation of assuming a position within the Office of the Secretary of Defense. This position within the Office of the Under Secretary of Defense for Research and Engineering will, as Dr. Cooper stated earlier, include the central focus and direction of directed energy weapon technology programs throughout DOD. The creation of this position reflects the concern both of the Department of Defense and of the Congress, as expressed several times, for centralized management of the Army, Navy, Air Force, and DARPA directed energy programs. The space laser program which is pertinent to today's hearing is certainly one of those programs. I would now like to say just a few words about my goals, objectives, and the current status of the space laser program.

SPACE LASER PROGRAM

I bring to the office 10 years, experience in directing high-energy laser technology. In addition, in the last 4 years I have directed the conventional armament acquisition of the Air Force in all phases from technology base to early production. The point is that I am very familiar with the crucial issue of transitioning technology into production. I am convinced that we are entering the era in which directed energy technology can confidently be transitioned into weapon systems. I think that applies in particular to space weapons. But we are not at that point today, as Dr. Cooper indicated. Let me summarize the current status.

The Air Force, DARPA, and the Army have been working since September 1981 to develop a joint program to resolve the known uncertainties associated with the potential feasibility and utility of space laser weapons. A DOD space laser program plan is in its final stages of preparation. On my left is Dr. Charles Cook of the Air Force Secretariat who chaired the ad hoc group that put the plan together. I intend to make as a matter of highest priority the review of that plan prior to its submission to the Congress.

This DOD plan draws heavily from the results of the DOD report to the Congress in May 1981 and the associated Defense Science Board review of that report. It incorporates efforts currently funded by DARPA, the Army, the Air Force, and those programs to be added as part of the approximately $50 million per year increase in funding for the fiscal years 1982 to 1987 as committed to by the Deputy Secretary of Defense. This additional funding will allow increased Air Force participation.

There are some obviously attractive benefits for using laser weapons in space. Without the atmosphere, the laser beam is not disturbed from the weapon to target, as we all know. Thus, lasers have the potential to transmit damaging energy at the speed of light over very, very long distances. Furthermore, lasers are not weapons of mass destruction. They direct energy to a prescribed target area and nowhere else. However, there are also many uncertainties which would make a space-based weapon commitment today very risky. These uncertainties are identified in seven major task areas listed in the order of priority:

The target vulnerability and hardening of the targets that we intend to attack.

The utility of the space laser system itself.

Is it survivable? Can it survive attacks that are made upon it?

Getting a baseline system definition.

And then the technology areas, the baseline technology which the DARPA Triad program is developing; the device, the pointing and tracking and the optics constitute the Triad program.

The enabling technology, which is what is necessary to go to a space-based system from programs in the Triad.

And the growth technology which would allow some of the more exotic missions to be performed.

The DOD space laser program is specifically focused to attempt to resolve these uncertainties [deleted], with an interim decision [deleted] to allow an informed weaponization commitment that Dr. Cooper was referring to.

The goal is to provide realistic estimates of the utility and cost effectiveness of space laser weapons for a broad range of missions. Two of the more attractive and probably nearer term missions are counterspace and counterair, that is, to establish and maintain space and air superiority. Additionally, although ballistic missile defense is an attractive and important goal, it is also the most difficult of space missions currently being studied. It is simply not clear the extent to which space lasers can address that mission. the planned program will attempt to provide the initial answer to this multifaceted question.

DARPA TRIAD PROGRAM

The largest part of the technology development will remain with the DARPA space laser Triad program that I alluded to earlier, all elements of which are scheduled to come to fruition [deleted] time period.

The Director for DARPA for the Directed Energy Office, Dr. Tanimoto, is also with us today.

The total DOD program resources for space laser R. & D., fiscal years 1982 through 1987, are approximately $1 billion, with over half of that contained within the DARPA budget and the remainder primarily within the Air Force budget.

I am pleased to note the progress that has been made in the last year on these programs. The DARPA Triad program has witnessed several experimental verifications of key technologies at the subscale level, and the initial designs of the demonstration hardware have been completed. Key among these accomplishments was experimental verification in the laboratory of a high efficiency, light weight chemical laser gain generator and in a separate experiment a laboratory breadboard demonstration of pointing with [deleted] precision, which is very, very good. Also, as you are aware, the Air Force recently established a new space laser program management office, and the program manager of that office in the Space Division is also with us today, Col. Harold Shelton.

In conclusion, Mr. Chairman, I want to assure you of a positive, aggressive program to use the resources which are provided by the Congress to resolve the key uncertainties which will allow us to move confidently and knowledgeably to space laser weapons. I will be sensitive to the show stoppers which may preclude space laser weapons, but I will be equally sensitive to the technology breakthroughs which may allow our plans to accelerate. I will inform the Congress as appropriate on these developments, and I intend to be responsive to your guidance.

Thank you very much.

Senator **Exon**. General, thank you very much.

I would like to ask a question for the record of both you and General Randolph.

SPACE LASER FUNDING

Are you satisfied and comfortable with the funding for fiscal year 1983 and the outyears on your program?

I know it is always difficult for you people in a program like this to say yes, we have plenty, and generally speaking when we go into that kind of question with people in the military, we are kind of asking for it to say no, you should double or triple it, but are you generally satisfied with what you have been provided? Do you think it will accomplish the mission during the timeframes that you are working in?

General **Lamberson**. Sir, within the space laser activities in my initial looks at that, as you say, it is a very difficult question. One can always spend more money. There are always technology issues which are not being funded or are of lower priority to those which are going on, but I believe that on balance, the space laser activities with the other directed energy weapons and technologies, as Dr. Cooper said, that we are in a very reasonable, and pragmatic position, and I believe that there is a very good chance that those resources will provide the answers needed to make the knowledgeable decisions in [deleted] and give us and you a good look at that progress by [deleted] which obviously would be dependent upon the 1983 funding. So we are comfortable with that.

Senator EXON. General Randolph, anything to add?

General RANDOLPH. Yes, sir.

First of all, Senator, I think that the U.S. space program is in the best shape that it has been in a number of years. We have a very aggressive program. We are working toward making sure that we have a fighting capability, a war-fighting capability with the space systems. Our organizations are reflecting that fact. With the help of this committee we have been supported. In the past we were able to get the Milstar program started directly with the assistance of this committee, and we appreciate that. We have a rather significant program for fiscal year 1983, and given that we continue to get the support as described in the President's 5-year defense plan, I think that the space program is in excellent condition.

Senator EXON. All right, now, let me ask you both a question.

What are our allies doing in this area? I assume that we are cooperating with them so that we wouldn't be stumbling over each other.

Are we and are they doing anything, and what is the coordination between those that we are militarily aligned with?

General RANDOLPH. I will have to say that most of the space activity in which we are cooperating with our allies, that I am aware of, is in the scientific area, in the exploratory vein. I am not aware of any extensive military programs. Of course, we build the three spacecraft for NATO here in the United States. I just had a meeting with some representatives from the United Kingdom whereby they plan to launch some United Kingdom communications satellites using our shuttle, and we are in the process of negotiations on how to do that.

So I would have to say it is limited to the communications area.

Senator EXON. General, what about laser technology per se as opposed to space laser technology?

General LAMBERSON. Sir, may I take that, and I would like to go also to Dr. Dick Airey, who is the Director of Directed Energy Programs.

Dr. AIREY. Yes, Senator, we have agreements, several bilateral agreements with certain NATO countries, specifically, the United Kingdom, France, Germany, in addition to Australia to share some of the technology of high energy lasers. This is restricted to the tactical applications of high energy lasers. We do not have any agreements with any other country covering the use of lasers for strategic applications.

Senator EXON. There must be laser research going on in other countries than the United States and the Soviets today though, with the laser that will shoot out that light bulb.

This must be a part of your program in order to seek breakthroughs. Is there general cooperation between the allies on this? Are you sharing information on basic research?

Dr. **Airey**. Yes, sir, we are sharing information on basic research. In the area of classified research, when it becomes secret we have specific agreements with those countries that I mentioned.

Senator **Exon**. Anyone else want to comment on that?

Thank you very much.

ANTIBALLISTIC MISSILE RESEARCH

Let me ask this question. We discussed in the first session this morning something about anti-ballistic missile research and we receive all kinds of briefings on that which is basically being supervised by the Army, and I am not clear as to how well we are doing on a laser ABM system. We are trying to develop other systems.

I guess when I think about this as a layman and what I am trying to justify in my own mind is that it would seem to me that if you have a fixed base and you are shooting a laser beam at something coming in at you, that would be a simpler device to go through R. & D. and into production than would the more exotic program of lasers in space. I am revealing my lack of knowledge in this area. I assume that, in space, lasers are not limited as they are down in this atmosphere, is that generally correct?

General **Lamberson**. That is one feature, Senator. Another very important factor that we indicated in the testimony is that of target hardening and vulnerability. [Deleted.]

Senator **Exon**. So, if I understand you as a layman in this area, then you are saying that it is more practical for us to put most of our research into the [deleted].

General **Lamberson**. Yes, sir.

Senator **Exon**. That is easier to do than what I would think it would be to point up there and get that coming in. Is that correct?

General **Lamberson**. That is easier to do, but it is still very, very difficult, and we do not know——

Senator **Exon**. It is a degree of easiness.

General **Lamberson**. Yes, sir.

Dr. **Cook**. And that is with respect to laser.

General **Lamberson**. Yes, that is with respect to laser beams which kill by thermal heating. It might not be so with other forms of energy.

Senator **Exon**. There are some other points I will submit for the record, but because we are running out of time, I have got to go to the floor.

If there are any additional comments by any of you gentlemen, I will be glad to hear them at this time.

Is there anything else that you would like to enter into the record now?

LASER COMMUNICATIONS

General **Randolph**. I would just like to mention one quick thing concerning laser communications that we were talking about earlier. The first use of laser communications [deleted].

Senator **Exon**. Dr. Cook?

Dr. COOK. I would like to make one comment and that is, you know, there are various policy statements around. We have treaties and other things. As was indicated earlier, the Office of Science and Technology Policy is now looking at the general topic of space policy and trying to sort through this. One of the big areas in there will be what the U.S. policy should be with regard to space weaponry. It is not terribly clear across the spectrum of the treaties and the policy that has been given so far. So this is a very important area that being worked on in conjunction with the technical opportunities and how the country wants to shape its policy.

Senator EXON. Gentlemen, I thank you very much for your input.

I would just like to leave you with the thought that Chairman Warner brought up earlier, and that is that as we sit here we need to have additional information that we can use to educate the public in general on this matter. Therefore, while we recognize the highly sensitive nature of the area in which you are working if, as you get involved in all of these highly secret ideas, you could also remember that we hope you will recognize we need some unclassified information that we can use to calm fears, to sustain the confidence of the public in the program and to get away as much as possible from the idea that the Soviets are so far ahead of us that they might come up with something tomorrow that would make all of our present systems obsolete.

We do have some questions for you for the record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

U.S. SPACE POLICY

Senator WARNER. Would you give us your perceptions as to where U.S. space policy as it relates to military uses of space is going over the next 5, 10, and 15 years? Do you see a growing percentage of our space resources being allocated toward military programs?

Dr. COOPER. Military space programs are becoming an increasingly integral part of our force. This results from many trends, including the need to operate in remote theaters, the loss of overseas bases, the more sophisticated demands of modern warfare including smart weapon systems, the higher cost of non-space alternatives for many critical functions. Within the military therefore, there are increasingly vocal demands for space systems with assured availability at all levels of conflict. Thus I believe that the most fundamental change of the next decade will be in the overall architecture of our military space program, as we grow from a development oriented program to a truly operational military capability. This transition will affect all aspects of how we do business in space—launch, satellite control, the space vehicles themselves, and the connectivity with the operating commands. These changes will undoubtedly be accompanied by major changes in our organizational structure for space.

In addition, new capabilities or missions will become attractive, taking advantage of the fruits of today's developments such as the Shuttle, high energy lasers, and numerous advances in communications, sensors, processing and system components. The trends described above will result in increased investments for military space programs.

Senator WARNER. To what degree, in your opinion, must such an allocation of resources take place in order for the United States to be confident of competing successfully with the Soviet Union in this arena?

Dr. COOPER. The purpose of the military space program is to contribute to an adequate overall U.S. military capability, both for conventional forces and in space. Given this objective, it is my opinion that there is no alternative to increased investment in military space systems—the advantages are too great and we have few viable alternatives. This does not mean that we should attempt to match the Soviets system by system. To me successful military competition with the Soviets in space means that we can accomplish those functions which we determine to be in our best interest at all levels of conflict. Further, successful competition means that we can deny the use of space for military purposes to the Soviets in periods of hostilities.

DARPA TRIAD PROGRAM

Senator **Warner**. What is your personal view of the DARPA Triad program? Do you believe that the United States should attempt to accelerate the deployment of a space-based laser system incorporating elements derived from the Triad program or do you believe that we should use the Triad development effort as a basis for advancing the state of the art and await significant breakthroughs before proceeding into actual on-orbit demonstration and deployment of a more advanced system?

Dr. **Cooper**. I believe that the DARPA Triad program is a properly paced effort to establish the technical feasibility of space chemical laser weapons at approximately the [deleted] performance level that is currently viewed as required level for a first generation weapon system. While the ground and space experiments of the Triad are aimed at lower performance goals, they are designed to show scalability to performance consistent with [deleted]. While the goals of the Triad are stressing and will represent a major technological advance, I believe that recent progress has shown that breakthroughs are not required to reach these goals. I do not favor redirection of the Triad to accelerate deployment of a space-based laser weapon due to the substantial uncertainties in system definition, system utility, target hardening potential and cost effectiveness identified in the DOD report to Congress a year ago. I do believe that the Triad program coupled with the DOD program to reduce these major uncertainties will provide a basis for an informed decision in the 1987 time frame on whether or not to proceed to a system deployment. The broader program in uncertainty reduction includes a substantial investment in growth technology (advanced beam control and short wavelength lasers) to allow an assessment of the promise of advanced or breakthrough concepts relative to chemical laser technology when that decision is made.

HIGH FRONTIER

Senator **Warner**. Dr. Cooper, have you had an opportunity to review the report produced by High Frontier, Inc. which charts a comprehensive approach to space-based and other defensive measures that the United States might deploy to enhance the capability of its more conventional weapon systems?

Would you comment in detail for the record on this report and its findings.

Dr. **Cooper**. The primary objectives of the space-based Global Ballistic Missile Defense (GBMD) system, proposed by High Frontier, is to perform what is called the Damage-Denial Mission. The ability to field a weapon system capable of destroying Soviet boosters and denying them the ability to inflict any damage on the United States would represent an ultimate achievement. The DOD has worked with the High Frontier analysts throughout the development of their concept and supports the basic Damage-Denial goal. However, as hardware developers of war fighting systems, we do not share their optimism in being able to develop and field such a capability within their timeframe and cost projections. We have conducted several in-house analyses and have experienced some difficulties in ratifying the existence of "off-the-shelf components or technologies" to provide the required surveillance, command and control, and actually perform the intercepts within the orbital and physical conditions described. Our understanding of systems implications and costs would lead us to project expenditures on the order of $200 to $300 billion in acquisition costs alone for the proposed system. While we are somewhat skeptical of the particular GBMD concept design, we will be interested in seeing how new technologies or other concepts may be employed to achieve a Damage-Denial Mission in a cost-effective manner.

GROUND-BASED LASER ASAT

Senator **Warner**. Dr. Cooper, what activities are being pursued to permit the exploitation of investments already made in ground-based lasers for anti-satellite capabilities? What funds and programmatic actions would be required to accomplish this?

Dr. **Cooper**. [Deleted.]

WILL STS BE PRICED OUT OF THE MILITARY MARKET?

Senator **Warner**. General Randolph, to what degree does the Air Force regard continued and substantial escalation in the costs associated with shuttle transportation as leading to a situation in which the Space Transportation System (STS) is priced out of the market as far as U.S. military missions are concerned?

General **Randolph**. The Shuttle is the necessary next step for the military space program. Costing the Shuttle as a simple replacement for the Titan ignores the value of the additional capability that the Shuttle (and its crew) offers to military operations. That capability is difficult to cost for a Titan comparison because it has no Titan equivalent. We are not, however, priced out of the market even with the increased cost of the Shuttle.

DOES THE SHUTTLE NEED AN UPPER STAGE TO BE VIABLE?

Senator **Warner**. General Randolph, to what degree does much of the viability and utility of the shuttle system from a military point-of-view depend upon the timely development and production of a cost-effective upper stage?

General **Randolph**. A substantial number of DOD payloads are designed for operational orbits at altitudes beyond those that the Shuttle can reach. Upper stages are, therefore, essential for these payloads.

The Inertial Upper Stage (IUS) is the product of an extensive development effort to produce a large (5,000 lb to geosynchronous) and highly reliable upper stage for Shuttle use. We have attempted in the Inertial Upper Stage to balance the cost of high reliability against the cost (both monetary and operational) of losing a high value payload due to a stage failure. That evaluation led to the current high reliability design for the Inertial Upper Stage.

The IUS will make its first flight (on a Titan launch vehicle) in September 1982. Its first flight on the Shuttle will be in January 1983 (the STS-6 flight with a Tracking and Data Relay Satellite as the payload). There are no near term alternatives to the Inertial Upper Stage. We plan the development of a Higher Energy Upper Stage (10,000 lb to geosynchronous class) for late fiscal year 1987. Until that time, the IUS is essential to military use of the Shuttle system.

WILL SHUTTLE RELIABILITY AFFECT MILITARY USE?

Senator **Warner**. General Randolph, to what degree does the experience to date suggest that the shuttle system will prove insufficiently reliable to satisfy stringent military support requirements? Do present projections for shuttle turnarounds indicate to you that present military payload delivery schedules are unlikely to be attained?

General **Randolph**. (a) There is no experience, to date, which suggests that the Shuttle will prove insufficiently reliable to satisfy military support requirements. The minor technical problems experienced in the first flights are typical of any early test program. The ability of the Shuttle (and crew) to adapt to and compensate for those problems is an extremely good demonstration of the unique flexibility of a manned system to recover a successful mission from a potentially crippling problem.

(b) The Shuttle turnaround projections concern all Shuttle users due to the potential impact on the entire traffic model. The DOD is, however, the priority user—the turnaround projections, to date, show no problems with meeting DOD launch requirements. The effect of the increased turnaround time projection (lost flight capacity) will be felt by the lower priority users.

ARE SHUTTLE ALTERNATIVES BEING RETAINED?

Senator **Warner**. General Randolph, are options being preserved with regard to military space system design and the expendable launcher production base to ensure that alternatives to shuttle delivery of crucial national security-related systems are being retained?

General **Randolph**. The DOD does not have a universally available alternative to the Shuttle. Each DOD space system has been individually programed to transition to the Shuttle based upon the circumstances of that program. Generally, they can be grouped as follows:

(a) Payloads which are currently compatible with both the Titan III (34)D and the Shuttle (e.g. DSCS III). These programs will have an alternative launch capability for so long as we maintain the Titan III (34)D backup capability.

(b) Payloads which are currently compatible with both the Titan III (34)D and the Shuttle but plan a significant payload upgrade which will make the Shuttle unique (e.g. DSP). These payloads will have an alternate launch capability for so long as they retain Titan compatibility or the Titan backup is maintained (whichever is lost first).

(c) Payloads which have been designed from the outset as Shuttle unique (e.g. SDS). No alternative launch capability exists.

(d) Payloads which are expendable launch vehicle compatible and will transition to the Shuttle in the far term (e.g. DMSP). No alternative launch system is required in the near term.

The DOD plans for the maintenance of the three essential elements of a Titan backup capability are as follows: Titan III (34)D hardware—sufficient to cover critical, Titan compatible DOD launches through fiscal year 1985. Titan III (34)D launch services—through fiscal year 1985 on the East Coast, through fiscal year 1986 on the West Coast. Titan III (34)D production capability—through September 1983, but with the option preserved to extend through September 1984 if needed.

NAVSTAR/GPS STATUS

Senator WARNER. General Randolph, what is the current schedule for procurement and deployment of the production spacecraft of the Navstar/GPS? What has been the impact of the action of the Congress last year upon the Initial Operational Capability of this system to which witnesses of the Department of Defense testified last year?

General RANDOLPH. We currently plan to buy all 28 satellites using a Block Buy contract that is incrementally funded to termination liability. This contract would begin in fiscal year 1982 using the money the Air Force is reprograming into GPS. Assuming a fiscal year 1982 start, satellites will be delivered as follows: (fiscal year 1985) 3; (fiscal year 1986) 7; (fiscal year 1988) 7; and (fiscal year 1989) 4. Congressional action last year deleted fiscal year 1982 procurement funding and authorized the Air Force to reprogram sufficient funds, if necessary, to maintain the Initial Operational Capability. If the reprogramming action and Block Buy approach are approved as requested, the 1988 system Initial Operational Capability can be met. In effect, the only way the DOD can now preserve the IOC and also remain within currently planned GPS procurement funding is to proceed with the reprogramming and the Block Buy. Annual procurement would cost considerable more in the near term. If GPS were limited to proposed fiscal year 1983 funding levels, annual funding would delay satellite delivery schedules up to 2 years.

STATUS OF GPS REPROGRAMING

Senator WARNER. General Randolph, what is the current status of the Department of Defense's response to congressional direction in the fiscal year 1982 appropriations bill for the reprograming of funds to support the GPS procurement? Does the Department of Defense not regard GPS as a sufficiently high priority item to justify the reprograming of significant funds to insure that the previous schedule is maintained?

General RANDOLPH. The Air Force will forward the reprograming action to OSD within a week. We regard the GPS satellite Block Buy as a high priority item. While we are requesting $20.1 million rather than the $76 million we originally envisioned, this amount does not reflect decreased priority. It merely reflects a third quarter, rather than a first quarter, fiscal year 1982 start of the Block Buy.

PROCURING GPS AT THE FASTEST POSSIBLE RATE

Senator WARNER. If the GPS program is, in fact, a high national priority, shouldn't we be pursuing the procurement and deployment of these spacecraft at the fastest possible rate in order to achieve both an earlier IOC and economies in acquisition cost?

What would the fiscal year 1983 increment—over and above that requested by DOD, be for GPS to permit it to achieve an earlier initial and full operational capabilities?

General RANDOLPH. The proposed GPS schedule is based on a production rate of seven satellites per year which is a balance between the high rate required for initial deployment and the lower rate (4/year) for operational replenishment. The current schedule could be accelerated up to 6 months with a $50M increase in fiscal year 1983 and a $100M increase in fiscal year 1984. This increase would partially fund additional production facilities which would be excess when used to support the operational replenishment rate after the GPS constellation is established. If the Block Buy were not approved, additional fiscal year 1983 funds could be required to fund an alternative multiyear or full funded procurement.

FUNDING SHORTFALL FOR MILSTAR

Senator WARNER. When Secretary Orr and General Allen appeared before the committee I posed the question to them was there not a significant underfunding in the MILSTAR research and development line for fiscal year 1983 and fiscal year 1984. At that time I was told that no such funding shortfall existed.

Is there in fact a shortfall in this amount on the order of $50 million in fiscal year 1983 and some $200 million in fiscal year 1984.

How did this shortfall arise and what steps are being planned by the Department of Defense to eliminate this problem?

What impact would there be on the program if the funding shortfalls were not rectified?

ANSWER. MILSTAR funding requirements for fiscal year 1983 and fiscal year 1984 depend on the date of our first launch and on the degree to which stated requirements are satisfied by the initial satellite configuration. In order to meet the full set of requirements with a satellite launched in 1987, we would require additional funding of $86M and $279M in fiscal year 1983 and fiscal year 1984 respectively.

We are in the process of reviewing cost-performance relationships for a number of satellite configurations—including a phased approach to full requirements satisfaction.

If the program is funded at the levels in the budget request for fiscal year 1983 and fiscal year 1984, we will take a phased approach to requirement satisfaction or delay the first launch approximately one year. A combination of these two is also a possibility.

CONGRESSIONAL ROLE IN GPS PROCUREMENT

Senator WARNER. General Randolph, to what degree is the maintenance of the present schedule and the programmed level of funding required for GPS a function of congressional approval of a multiyear procurement of the GPS spacecraft? Would a larger amount of procurement funding in fiscal year 1983 permit a more efficient block buy of GPS satellites than that currently planned? What would be the additional costs so required?

General RANDOLPH. The present schedule and the programmed level of funding is totally dependent on Congressional approval of the GPS multiyear procurement. Procurement of 28 GPS Satellites using an annual full funded approach at the requested fiscal year 1983 level, would result in up to 2 years delay in obtaining the full GPS capability and require more than $200M in additional funding in fiscal year 1984 and subsequent years. The proposed GPS block buy procurement acquires satellites at the most efficient rate. Additional fiscal year 1983 funds could be required if an alternative multiyear or full funded procurement approach were used.

SPACE-BASED LASERS: FEASIBILITY AND AVAILABILITY

Senator WARNER. General Lamberson, recognizing that you are still in the process of assuming your new responsibilities, what is your judgment as to the feasibility of the United States developing a militarily useful laser system based in space and when do you believe that the system could be available?

General LAMBERSON. The feasibility of a militarily useful laser system based in space is yet to be demonstrated, and such a demonstration is several years away, no matter how much funding might be applied to the program. Speculation as to the probable outcome of the feasibility demonstration program is not very enlightening. The potential utility of such weapons is sufficient to justify the currently planned moderately paced program to develop the appropriate technology and fabricate and test demonstrators, in order to determine from actual experiments the limits of the technology.

Senator WARNER. General Lamberson, in your opinion, should the United States be pushing for an evolutionary approach to space-laser deployment, or should we wait until an appropriate technology is available to make that deployment?

General LAMBERSON. History is replete with examples where immature technology, rushed into deployed systems, has resulted in systems that worked poorly, had low availability rates, or both. For a system to be deployed on-orbit, where both check-out and repair are difficult, especially for a system which must have a long lifetime in a standby mode, one must have appropriate technology available before fabricating a system for deployment. The principal issue is the rate at which the development of the appropriate technology should be pursued, and that is a decision which must be made in light of competing requirements for the funds available to the Department of Defense. We are requesting $156 million for the space portion of the DoD high energy laser program in fiscal year 1983. I believe that this level of funding is sufficient and prudent, given the existing uncertainties in technology and ultimate mission utility. The program may warrant much larger levels of commitment in the mid 1980's if these uncertainties are resolved favorably.

Senator WARNER. In your personal opinion, do you believe that the deployment of a [deleted] laser system, which is believed to be a feasible outgrowth of the present DARPA trial program would be worth the cost to deploy—even if doing so came at the expense of delaying in time, or reducing the funding for, the development of more militarily-useful laser concepts?

General LAMBERSON. I believe that the decision to deploy a space laser weapon system should await the outcome of the efforts I described earlier. Those efforts, the Triad program as part of the joint DoD uncertainty reduction program including advanced or growth technology, will provide a basis for an informed decision on subsequent deployment.

SPACE-BASED LASERS: IMMEDIATE INTEGRATION

Senator WARNER. General Lamberson, as you may know, the General Accounting Office has prepared a report which supports, as an option for consideration as part of the development of a space-based laser program for the United States, proceeding immediately to an on-orbit demonstration of an integrated laser system incorporating off-the-shelf laser, optics, and pointing and tracking systems. Would you comment on this proposal?

General LAMBERSON. The option which the General Accounting Office considered was one of the four options considered by the Department of Defense in preparing the Report to Congress on Space Laser Weapons submitted in May of 1981. Neither the GAO nor the DoD report recommends a specific alternative. In the forwarding letter of the DoD report, we recommended a $50 million per annum addition to the program, to address critical uncertainties in mission utility, system design and survivability, and technology development. I concur with that recommendation.

SPACE-BASED LASERS: SBL INDUSTRIAL BASE

Senator WARNER. General Lamberson, are you concerned that the U.S. industrial base may have acute difficulties in supporting the requirement for essential components of any useful space-based laser system, for example, the large optic system? If we expect to have the capability to deploy a number of space-based laser systems requiring 5, to say nothing of 10 or 20 meter mirrors by some time in the next decade, is it not the case that the U.S. capacity for producing such mirrors must be increased?

General LAMBERSON. The recently completed NASA large space telescope mirror of 2.4 meters diameter represents the National state-of-the-art in large diameter optical systems. The five to ten meter mirrors required for space-based laser systems in the future invoke a new technology which goes beyond that of the large space telescope. Namely, the requirements for ultralight weight, active surface control elements and segmented construction are not traceable to the space telescope technology.

Assuming that the postulated technology can be achieved, several key manufacturing issues still remain. First, the production of ultra low expansion glass in this country is currently limited to a single source. The quality and purity requirements of this material make its production a complex and time consuming procedure. Second, the necessity for precise optical finishing of space-based laser mirrors requires specialized facilities and skilled craftsmen of limited availability. The aspherical shapes of off-axis (non-symmetric) nature of segmented space-based laser mirrors is unlike that of the large space telescope design.

Before the U.S. industrial base for producing large diameter optical systems can be expanded, we must first establish the necessary technology and engineering procedures for fabricating these novel optical elements. DARPA's Segmented Mirror Technology Program is designed to provide this relevant technology in a timely manner.

Senator WARNER. Are the costs of such industrial base preparation and expansion factored into the estimate you are identifying as the likely cost of a space-based laser system?

General LAMBERSON. At the present level of maturity of technology for space-based laser weapon systems, the only sort of cost estimate that can be made is with the use of a general algebraic formula for the total cost, based on estimates of system weight and other general parameters, together with the historic costs of other space systems. Costs cannot be estimated in any meaningful fashion from aggregating the individual elements of a detailed system breakdown. Hence the cost of developing an industrial base for the manufacture of large diameter optics for a space-based laser system is not specifically included in the cost estimates for deploying a space-based laser weapon system.

FREE ELECTRON LASERS

Senator **Warner**. General Lamberson, have you had an opportunity to consider the prospects for using power sources for lasers other than chemical reaction? Have you, for example, reviewed the findings of Dr. John Rather which indicate that a free electron laser concept could prove to be substantially more satisfactory as a weapons system than will chemical lasers? Would you provide a detailed assessment of this concept for the record?

General **Lamberson**. The free electron laser is one of a number of lasers which may eventually prove to be substantially more satisfactory than chemical lasers. However, the experimental data base is not sufficient at present to make a determination that such is the case. The Defense Advanced Research Projects agency presently has a program to explore free electron laser technology, including the fabrication of a demonstrator at the Los Alamos National Laboratory. This program has recently successfully demonstrated gain at predicted levels [deleted] through the lasing medium, coupled with an appropriate energy loss by the electron beam. These experiments verify, at a small scale, the theoretical models which project [deleted] free electron laser power at electrical efficiency [deleted]. Resolution of remaining fundamental technical issues [deleted] will allow a decision to commit to fabrication of a scaled-up high power free electron laser device [deleted]. However, a free electron laser at the power levels demonstrated by chemical lasers almost a decade ago has yet to be demonstrated. Chemical laser technology is much more mature than free electron laser technology, and the development of that maturity in the free electron laser should occur at a measured pace, along with other essential elements of the DOD high energy laser program.

In the longer term, [deleted] laser technology currently under development by DARPA and the Air Force, may provide us with several options for strategic weapon systems. These technologies, which include both excimer and free electron laser technology, may provide the basis for a laser system based in space, a laser system on the ground whose beam is relayed via space-borne mirror systems, or a laser system on the ground which could attack satellites directly. For example, development of a [deleted] excimer or free electron laser for ground-based use, together with a [deleted] beam director, fully corrected for the effects of atmospheric turbulence, could provide the potential for fielding a ground-based laser antisatellite system capable of negating satellites in geosynchronous orbits. The [deleted] Laser Program at DARPA is currently evaluating, through subscale experiments, the scalability of free electron and excimer lasers to high power, and several atmospheric compensation technologies for these more stressing ground-based laser antisatellites applications. Currently planned funding, $26.6 million for fiscal year 1983, is adequate for this effort.

Senator **Exon**. I thank you very much for coming, and I join the chairman and others in apologizing for the way we have had to rush you through today. We don't like to do that, but it is one of those situations.

The meeting is adjourned.

[Whereupon, at 12:33 p.m., the subcommittee adjourned subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATION FOR FISCAL YEAR 1983

FRIDAY, MARCH 12, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

STRATEGIC COMMAND, CONTROL AND COMMUNICATIONS

The subcommittee met, in open session, pursuant to notice, at 8:30 a.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Staff present: James F. McGovern, general counsel; Frank J. Gaffney, George K. Johnson, Jr., José E. Martinez, Patrick L. Renehan, and James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, asssistant to Senator Warner, Jim Dykstra, assistant to Senator Cohen, Frank Krebs, assistant to Senator Cannon, Greg Pallas, Assistant to Senator Exon, and Peter Lennon, Assistant to Senator Levin.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator **WARNER**. Gentlemen, good morning. I appreciate your prompt attendance this morning at the hearing. I know you have traveled long distances to get here.

This is a very important hearing and it is the desire of the Chair to conduct part of it in open session in the hopes of providing a measure of reassurance to America and others that the responsibilities that you collectively manage are being executed well. I am pleased to note that together with the efforts of this committee and others in the Congress with two successive administrations now, we have taken major steps to modernize the equipment with which to perform your respective responsibilities.

I had an opportunity to have a preliminary discussion yesterday with Secretary Latham. We covered certain areas that I thought were important. We will hear it in open session this morning.

Mr. Secretary, why don't you lead off.

STATEMENT OF HON. DONALD C. LATHAM, DEPUTY UNDER SECRETARY OF DEFENSE (COMMUNICATIONS, COMMAND, CONTROL AND INTELLIGENCE), ACCOMPANIED BY GEN. BENNIE DAVIS, USAF, DIRECTOR, JOINT STRATEGIC CONNECTIVITY STAFF AND COMMANDER IN CHIEF, STRATEGIC AIR COMMAND, SAC; GEN. JAMES V. HARTINGER, USAF, COMMANDER IN CHIEF, NORTH AMERICAN AEROSPACE DEFENSE COMMAND AND AEROSPACE DEFENSE COMMAND; LT. GEN. HILLMAN DICKINSON, USA, DIRECTOR, COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS, ORGANIZATION OF THE JOINT CHIEFS OF STAFF; VICE ADM. GORDON R. NAGLER, USN, DIRECTOR, COMMAND AND CONTROL, OFFICE OF THE CHIEF OF NAVAL OPERATIONS, DEPARTMENT OF THE NAVY; AND BRIG. GEN. GERALD L. PRATHER, USAF, DIRECTOR, COMMAND, CONTROL AND TELECOMMUNICATIONS

Mr. LATHAM. Thank you.

What I would like to do, sir, if I may, is to give you a top down view and at the end of the discussion to emphasize the area of the NORAD upgrade and what we are doing to improve the communications command and control capability and the warning threat assessment capability of our North American defense establishment.

First of all I would like to talk about long-term trends in national defense. The Soviet momentum has been increasing which coupled with U.S. disinvestments in the past have placed us in a serious defense posture. We are striving for 7 percent real growth per year. However, that growth is certainly contingent on how well the economy recovers.

What we are trying to do in this program is modernize the strategic forces across the board including the C^3I and including also a modernization of theater nuclear forces and conventional forces.

THE PRESIDENT'S DEFENSE BUDGET

Driven by the expanding Soviet threat.

Justified and not extravagant: must regain strength.

Nuclear strength is not a substitute for conventional strength—e.g. 85 percent of total is for non-nuclear forces.

Despite projected real growth, Soviet investment is likely to exceed ours for many years.

Approval means the danger to our security can be brought under control.

Now the President's budget is summarized here. It is driven by the Soviet threat. It is a budget which we believe is justified and not extravagant. As you know, sir, we believe that nuclear strength is not a substitute for conventional capability. In fact 85 percent of the budget is devoted to buying nonnuclear capable forces. Despite our projected real growth in the defense budget we believe the Soviet investment in the next few years will probably exceed ours. We believe that approval of our budget will reduce the danger substantially to the American people and we can bring our security under control.

CONSTRUCTION OF THE STRATEGIC FORCE PACKAGE GUIDING PRINCIPLES

Must be comprehensive.

Focus on enduring survivability.

Be relatively indifferent to the Soviet response.

Highly effective enduring C^3 can be traded off against the need for additional weapons.
Increase overall deterrent stability.
Counter threats to the air-breathing forces.
Develop enduring strategic defenses—furthers deterrent effectiveness without buying additional weapons.
Preserve vital attributes of land-based ICBMS.
Capability to expand forces if required.

Now if we look at how we constructed the strategic force package it is based on a set of guiding principles that are summarized here. First of all I emphasize the package is a package which is comprehensive. It cannot be taken apart piece by piece. You will hear a great deal of discussion today on the enduring capability of the package. We are stressing endurance and survivability. We are trying to build a package that is indifferent, or relatively so, to Soviet responses to the strategic modernization package.

We believe, and we will discuss in great detail today, that enduring command and control communications capability can in fact be traded off against the need for additional weapons. We believe that is quite important.

We will discuss our need for a stable deterrence which is what we are trying to strive for as we present this package. We will talk briefly today about North American air defense and improvement in modernization of the North American air defense system as well as endurance of strategic defense. Both space and missile defense are being addressed.

The package also says let us preserve the vital attributes of the ICBM force such as accuracy and response time and importantly the way we have designed the package it has the capability to expand.

STRENGTHENING OUR DETERRENCE—PRESIDENT REAGAN'S COMPREHENSIVE PROGRAM

Revitalize our strategic nuclear deterrent.
Create a more stable and secure deterrent.
The President's program—five mutually reinforcing elements.
First: Improve our communications and control systems.
Survivability and endurance.
Improved warning: Pave paws—NORAD upgrades
New communications systems: GWEN—MILSTAR—ECX.
Survivable command facilities: MCC—NECAP.
North American Air Defense.

Now if you look at the deterrence, what do we mean? This is a system perspective. It involves policy, strategy, and plans which are procedures which have been put down on paper and worked out in numerous exercises and finally force management and forces which are actually pieces of hardware and systems to control those forces. We are going to focus on that latter aspect today.

Now if you look at the stragetic package that the President announced on October 2 and as it has been reiterated in the fiscal year 1983 budget submitted to Congress, it has the goal of revitalizing and providing a more stable and secure deterrent and it has five mutually reenforcing elements. Importantly at the very top of this was the communications command and control element. We will talk only to that today.

What that element at the package asked for will do the following things: Provide survivability and endurance, improved warning, provide new communications systems, provide a survivable enduring command facility, and address North American air defense. We will go into some detail on those pieces of this package today.

PRIORITIES FOR STRATEGIC C^3

Assured reliable performance in peacetime, including exercises.
Capability to execute the SIOP during or after an attack.
Support to continue operations over a protracted period of conflict.

The guidance that we used or the handbook that the Secretary of Defense publishes each January is what we design the system to respond to. These are the things that in the top down look the guidance asks us to do. Importantly, the capability to execute the SIOP during or after an attack is one of the driving requirements in the defense guidance.

OBJECTIVES FOR STRATEGIC C^3

Modernize and improve in six functional areas:
  Communications.
  Command posts.
  Indications and warning.
  Navigation and position fixing.
  Satellite mission control.
  Air surveillance of North America.

There are some elements in this defense guidance that specifically we are asked to address. We are modernizing and improving these six functional areas in the C^3 arena. We will talk to each of these today as we go through them and describe the package to you.

Now, if you look at C^3 I, one way to describe it is, I call it, a Triad. I would like to break it down into pieces because it helps to understand the problem, for example, warning and attack assessment, command and decision facilities and processes, and lastly supporting communications to make that all happen. In a very simplified way, here is how the strategic command and control process is supposed to work.

We have a set of tactical warning sensors, radars and satellites, aircraft sensors. We have rearward communications that go into national command centers, and supporting this is a very important function called strategic warning which is something that takes place 365 days a year, 24 hours a day, prior to any shooting which alerts the forces and puts them in a more capable posture.

Once a decision is made by the national command authority, communications then are provided to the forces to execute the President's orders. What we are trying to do then is modernize and address each of those pieces.

WARNING AND ATTACK ASSESSMENT INITIATIVES

Survivability upgrades to warning satellites.
Mobile ground terminals for warning data readout.
Two new Pave Paws radars: Southeast—Southwest.
Modernization of BMEWS radar systems: New Computers—Radar Improvements.
Advanced warning concepts in R&D.
Integrated Operational Nuclear Detonation Detection System (IONDS): Hosted on the NAVSTAR satellites—a vital program.

Shown here are warning and attack assessment initiatives in the fiscal year 1983 budget. We want to improve the survivability and upgrade the performance of the warning satellites. These are some features that will include better communications to and from the satellites, ability to link the satellites together, things of that nature.

Mobile ground terminals, we are procuring six of those so that we can have the output of the defense satellite program readout of mobile terminals which will be very difficult to target and take out by the Soviets. We are asking for two new Pave Paws radars, one southeast and one southwest. We have one in the northeast and in the northwest. The southwest radar will in fact be an enhanced performance radar to handle also some space surveillance function.

Modernization of BMEWS radar systems with new computers is underway and will be completed this year. There are a number of radar improvements to the UHF radars of the BMEWS system. We have advanced warning concepts in R. & D. that look quite promising.

In addition, we are intending to launch a satellite-based global position system. (GPS) which also carries the new integrated operation nuclear detection system, IONDS, which is very important for damage assessment and strike assessment and the way we deal with the strategic reserve.

COMMAND AND DECISION INITIATIVES

Hardening against nuclear effects: National command authority airborne command posts—force commanders airborne command posts.

Mobile command centers (MCC): Ground mobile van system for CONUS—support to NCA/JCS/force commanders.

Survivability and capability improvements to fixed command centers: emergency power—additional hardening against EMP—processing and data displays.

Other survivable command basing options under study.

In the area of the command and decision initiatives, we are hardening the airborne command posts and making capability improvements to them. We are embarking on a program called mobile command centers. These are ground mobile vans to support NCA, JCS, and force commanders. We are looking at ways to improve survivability and capability of existing command centers; although we understand they are extremely vulnerable. Emergency power is part of the upgrade to the existing fixed command centers.

What we are also doing is looking at a number of other ideas for survivable command facilities such as deep underground basing and things of that nature.

STRATEGIC COMMUNICATIONS INITIATIVES

Ground Wave Emergency Network (GWEN).
    Low frequency: resists nuclear effects & jamming.
    Many nodes: survivable/enduring.
    Conus wide: connectivity.
    Many uses: SAC/NCA/forces.
New ECX aircraft for TACAMO.
MILSTAR EHF communications satellite system.
    Extremely resistant to jamming & nuclear effects.
    Numerous survivability options incorporated.
    Assured connectivity:
        NCA and forces.
        Force commanders and weapon systems.
        Report back.

- LF/VLF receivers on bombers.
- DSCS III production.
- ELF for communications to submarines.
- Three additional fleet communications satellites.
- Reconstitutable communications concepts under study.

In the communications area we have a large number of initiatives underway as summarized here. The first of these is the so-called GWEN. It is a low frequency ground wave system that is very resistant to nuclear effects and jamming. It will consist of several hundred nodes so that in order to take it out you will have to take out a large number of those. It will be CONUS wide for connectivity and have many uses and serve many purposes such as provide CINCSAC the ability to positive control launch the bombers and provide force direction information. It is not a voice system. It is a data system. It will be secure and very reliable.

Other communications initiatives include new ECX aircraft to replace TACAMO, and a major communications satellite system known as MILSTAR. We are underway in fiscal year 1982 with some concept and definitional studies. MILSTAR will be a survivable and enduring satellite system. We are putting LF and VLF receivers on bombers so that we can assure greater connectivity in the face of nuclear effects and jamming.

DSCS-III is in production. We are putting ELF communications capability into the submarines. As you know, the transmitter sites are in Michigan and Wisconsin. We are buying three additional Fleet communications satellites, Nos. 6, 7 and 8. We are looking at how to develop a reconstitutable communications system such as launch additional satellites poststrike. When you look at how you endure the system after the first strike, everything in green must be survived or reconstituted in order to make the system work again.

In other words, provide damage assessments, strike assessments, reconstitution and recovery, plan additional mission and targeting to CINCSAC and other commanders, this kind of support, including a survivable intelligence system to provide inputs as to what to do and also lead to war termination. So the areas in green are very important to us in terms of the enduring C^3I system.

Let me talk briefly then about what we are requesting from you in the fiscal year 1983 budget for C^3, not intelligence, just C^3 today.

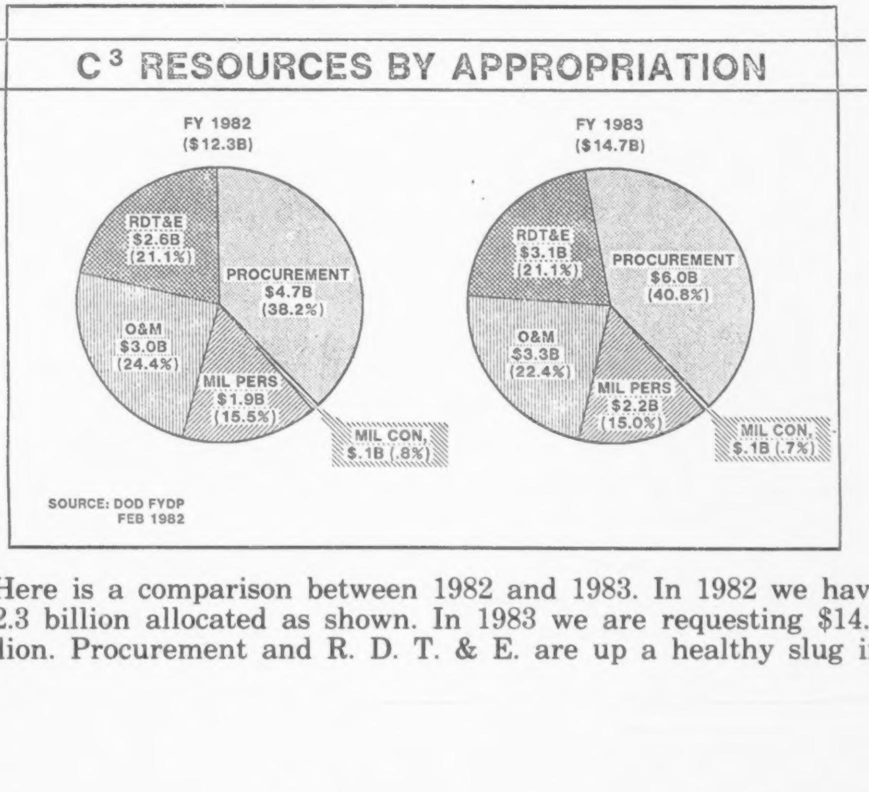
COMMUNICATIONS COMMAND AND CONTROL (C^3) MISSION AREA STRUCTURE

STRATEGIC C^3	THEATER & TACTICAL C^3	NAVIGATION/ WARFARE COMMAND & CONTROL	SUPPORT & BASE COMMUNICATIONS
• STRATEGIC C^2 • STRATEGIC S&W • STRATEGIC COMMS	• THEATER C^2 • THEATER COMMS • TACTICAL C^2 • TACTICAL COMMS	• LAND WARFARE • AIR WARFARE • NAVAL WARFARE • NAVIGATION & POSITION FIXING	• SUPPORT COMMS • BASE COMMS

EW & C^3 COUNTERMEASURES	COMSEC	INFORMATION SYSTEMS AND DEFENSE COMMUNICATIONS SYS
• SELF-PROTECTION • ESCORT; STAND-OFF & COUNTER C^3 • TACTICAL SURV., RECCE. & TARGET ACQ • MULTIMISSION, TECHNOLOGY & SUPPORT	• COMMUNICATIONS AND SIGNALS SECURITY	• INFORMATION SYS • COMPUTER SECURITY • LONG HAUL COMMS • COMM. SERVICES INDUSTRIAL FUND

EFFECTIVE MAY 1982

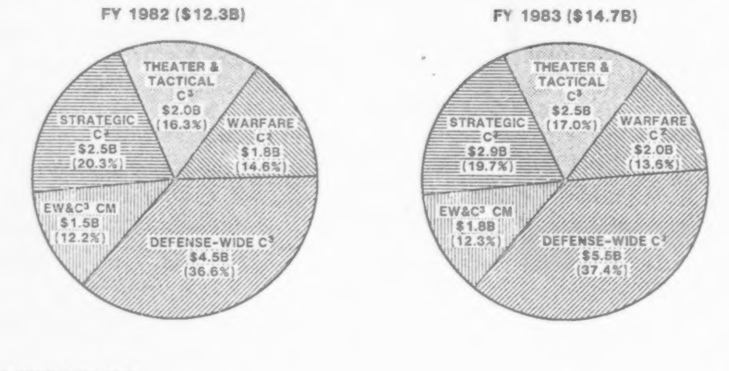
Here are the mission areas in the C^3 area I worry about. We are going to talk primarily about C^3. These are the other areas encompassed in the total budget area.


C^3 RESOURCES BY APPROPRIATION

SOURCE: DOD FYDP FEB 1982

Here is a comparison between 1982 and 1983. In 1982 we have $12.3 billion allocated as shown. In 1983 we are requesting $14.7 billion. Procurement and R. D. T. & E. are up a healthy slug in fiscal year 1982 and 1983. We are moving from $4.7 billion procurement to $6 billion in the total package.

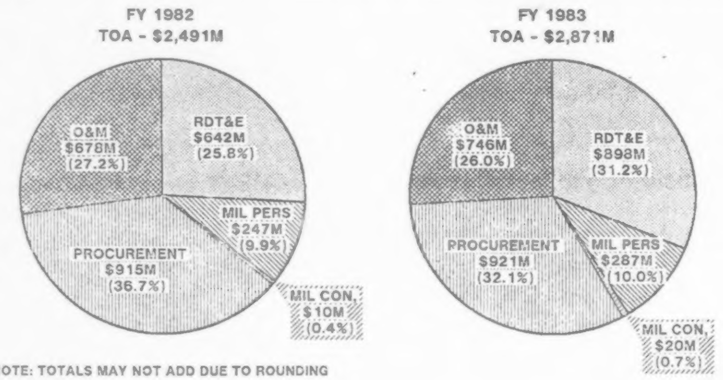
C³ RESOURCE BY MISSION AREA



SOURCE: DOD FYDP
FEB 1982

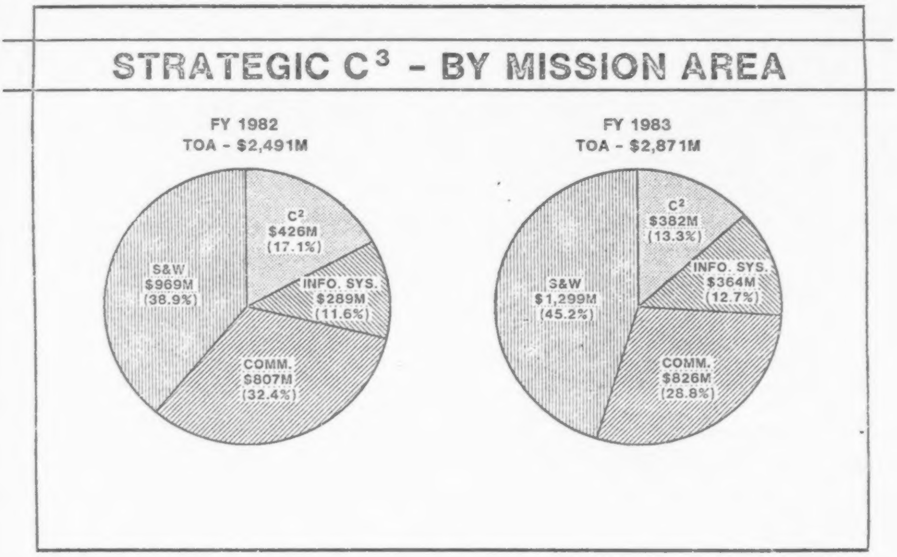
If you look at it by mission area, the strategic is about 20 percent of the total budget request or $2.9 billion. That is up from $2.5 billion in fiscal year 1982. One of the goals I have, by the way, is to examine this defense-wide area and see if that can't be reduced in cost by some innovative things such as leasing and fewer people.

STRATEGIC C³ - BY APPROPRIATION



NOTE: TOTALS MAY NOT ADD DUE TO ROUNDING
SOURCE: DOD FYDP
FEB 1982

If you look at the strategic area by appropriation I am comparing 1982 to 1983, $2.5 billion to $2.87 billion in strategic. Again procurement and R. D. T. & E. are up in the budget. I am sorry, procurement is down in the strategic because this has some aircraft which we do not have this year. That is down slightly and R. D. T. & E. is up substantially. If you look at it by mission I have it summarized here.



Again the surveillance and warning function received approximately 40 percent of the budget last year and 45 percent this year. That is being improved and there are more dollars there. Communications are about the same and so on as shown.

NORAD SYSTEM IMPROVEMENTS AND PERFORMANCE

Off-site test facility established.
Upgraded five largest computers.
Added computer error detection system.
75 million messages sent since Nov. 1980 without one error message.
Computer architecture plan prepared.
Diesel generations refurbished and uninterrupted power supply funded.

Now I would like to turn to those NORAD incidents that have created so much publicity. As you know, sir, back in June 1980 there were two incidents in which a communications processor in the NORAD complex malfunctioned and caused erroneous data to be briefly sent to command centers. Since then the Department of Defense and Department of the Air Force in particular have done a number of things to correct the system design and reliability. We have done an extensive review by the Air Force Inspector General, by the GAO and by the Department of Defense and Department of the Air Force in particular. We have installed a number of technical fixes that I will summarize for you.

The system returned to full operation in November 1980. A number of management changes have also been instituted. In particular and sitting here today we have established a system integration office in NORAD under Maj. Gen. Winston Powers. He heads that office and he has complete responsibility for the integrity of the system, from the sensors through the entire warning and attack process. This systems integration office was fully established in October 1981. In addition a fully staffed offsite test facility is operational.

HISTORY OF NCMC ADP SYSTEM ACQUISITION

1970 1978—Extensive software and hardware work.
422 EOC: Sep 79.
Recent NCMC ADP improvements.
Off-site test facility (requirement validated Oct. 80).
Permits ADP systems development/test in a non-operational environment.
Missile warning bypass.
Provides redundant comm processing for critical TW/AA information.
Under AFSC/ESD acquisition.
IOC: Dec 82.

CSS upgrade (August 1981).—Upgrade of HIS 6050 processors to HIS 6060 configuration (cache memories, expanded instruction set); and improved availability, programming flexibility.

CPS upgrade, phase I (Sept. 18, 1981).—Improved memory, interface controllers and disk drive capabilities to each HIS 6080.

CPS upgrade, phase II.—Replacement of low-speed HIS 6080 peripherals with modern I/O devices; and

IOC: June 1982.

Fiscal year 1983 funds will support.—Additional near-term NCMC improvements; and initial efforts to replace major NCMC ADP segments.

Fiscal year 1982 construction of new computer center complete June 1982.

Now I would like to summarize with two viewgraphs, the history of the ADP acquisition which seems to be a bone of contention in the GAO report. Between 1970 and 1978 there were extensive things done in software and hardware work. Recently a number of things have taken place such as the offsite test facility, a missile warning bypass function is being installed which will provide redundant communications capability for the threat warning and attack assessment information. It is under acquisition with IOC this December. This is a major improvement.

Next we have upgraded the communications system and in particular we have upgraded computers from the 6050 to 6060 in the hardware area. Those are new and improved upgraded computers. We have improved here in the Phase 1 case the memories and disk drive and so on.

NORAD improvements.—Fiscal year 1982 budget

	Millions
R. D. T. & E.:	
NORAD ADP	2.4
NORAD combat ops center	23.5
Other procurement:	
NORAD ADP	2.8
NORAD combat ops center	4.2
Total investment	32.9
O. & M.	
NORAD ADP	17.4
NORAD combat ops center	14.2
CMD CTR processing and display	2.0
Mil Pers:	
NORAD ADP	2.3
NORAD combat ops center	20.3
CMD ctr processing and display	2.8
Total operations	59.0
Total	91.9

In Phase 2 we are going to replace some peripherals and get some more modern devices with IOC in June 1982. Additional support in 1983 further enhances the capability in the site. Here are the dollars we are spending in 1982. NORAD ADP and NORAD Combat Operations Center, R.D.T. & E. about $25 million. Other procurement here, about $7 million plus O&M and Mil Pers totaling $91.9 million in 1982. For 1983 the number is up substantially to $141.3 million dollars.

NORAD improvements.—Fiscal year 1982 budget

	Millions
R. D. T. & E.:	
NORAD ADP	6.2
NORAD combat ops center	25.4
Other procurement:	
NORAD ADP	.4
NORAD combat ops center	28.0
Milcon:	
Power upgrade	11.0
Total investment	71.0
O. & M.	
NORAD ADP	21.6
NORAD combat ops center	17.5
CMD CTR processing and display	2.3
Mil Pers:	
NORAD ADP	2.5
NORAD combat ops center	23.1
CMD ctr processing and display	3.3
Total operations	70.3
Total	141.3

Again you will see here in the R.D.T. & E. about $31 million. Other procurement up substantially, to $28.4 million now.

Here is the power upgrade. We have been working on the design of the power system for the last 2 fiscal years. Having got that design we go into MilCon and put the power system in. Here is the $11 million for that. The total budget for fiscal year 1983 is $141.3 million.

HOUSE GOVERNMENT OPERATIONS COMMITTEE.—REPORT ON NORAD 8 MARCH 1982

HGOC recommendation No. 1.

Exempt NORAD from mandatory use of WWMCCS standard ADP.

C^3 I preliminary assessment.

Agree, this is our policy as stated in WIS modernization plan provided to Congress in January 1981.

HGOC recommendation No. 2.

Exempt other major commands from use of standard WWMCCS system.

C^3 I preliminary assessment.

Agree where needs are command unique.

This policy contained in the WIS modernization plan provided to Congress in January 1981.

Disagree where the standard system is not fulfilling mission needs.

Common requirements are most efficiently met through a single development.

HGOC recommendation No. 3.

Ensure funds are immediately available for an uninterruptable power supply (UPS) at NORAD.

C^3 I preliminary assessment.

Sufficient funds to procure the NORAD UPS are contained in the fiscal year 1983 budget submission.

HGOC recommendation No. 4.

Take immediate steps to ensure NORAD acquires the most modern computer technology available.

C^3I preliminary assessment.

Agree. Actions are underway.

Short term and long range programs to improve or replace ADP in fiscal year 1983 budget submission.

HGOC recommendation No. 5.

Implement recommendations of GAO concerning NORAD and WWMCCS projects.

C^3I preliminary assessment.

NORAD.

We have implemented recommendations to: Support 427M replacement planning; support electrical power upgrades; and exempt NORAD from use of standard WWMCCS computers.

WWMCCS ADP.

Several GAO reports: Major thrust of criticisms; lack of central management; and we established JPM.—obsolete hardware; to be remedied by WIS modernization under JPM direction.

HGOC recommendation No. 6.

Review management structure of WWMCCS project; and strengthen WWMCCS central management and control.

C^3I preliminary assessment.

Accomplished.

WIS JPM is the single focal point for WIS modernization.

HGOC recommendation No. 7.

Initiate an objective and independent analysis of entire WWMCCS modernization program.

C^3I preliminary assessment.

Being accomplished by newly appointed WIS JPM as initial step.

HGOC recommendation No. 8.

Assess central information resource management structure to strengthen oversight of resources pursuant to Paperwork Reduction Act of 1980.

C^3I preliminary assessment.

Recommendation not understood in context of report.

C^3I systems such as NORAD ADP and WWMCCS ADP expressly excluded from purview of Paperwork Reduction Act.

HGOC recommendation No. 9.

Submit quarterly reports on status of NORAD and WWMCCS modernization efforts to HGOC, SGOC, SAC, HAC, HASC, SASC.

C^3I preliminary assessment.

We remain responsive to congressional requirements for information.

Quarterly reports on major programs could burden the Congress with program detail.

Suggest reconsideration of what appears to be an overly burdensome and precedent setting requirement.

HGOC recommendation No. 10.

Take immediate steps to ensure GAO has full and open access to information.

C^3I preliminary assessment.

This is standard DoD policy.

HGOC recommendation No. 11.

Administrator of Office of Information and Regulatory Affairs (OMB) should review corrective actions by DoD for NORAD and WWMCCS and provide evaluation of these actions by 1 June 1982.

C^3I preliminary assessment.

Recommendation not understood in context of WWMCC and NORAD ADP.

Presumably, OMB review recommended under preview of Paperwork Reduction Act, from which these particular systems statutorily exempted.

Let me answer specifics in the recent Brooks report. He has a series of recommendations and I would like to go through these very quickly. First he said their recommendation would exempt NORAD from the mandatory use of the WWMCCS standard ADP. We agreed with that. Our policy on that was stated in the report we provided to Congress in January 1981. In fact there are at least five references in which we have provided that exemption and many of them predate this. So we agree with that.

The second one would exempt other major commands from use of standard WWMCCS, and we agree that is needed and the needs are command unique. This policy is contained in the WWMCCS modernization plan. We are looking at a more common development approach here and don't fully concur with that particular part of the second recommendation.

Next, the report said to insure that funds are immediately available for an uninterruptible power supply at NORAD. Sufficient funds are there to procure that. We did the design in the last fiscal year. The six diesel generators have been completely rehabilitated and an uninterrupted power source is going to be put in.

No. 4, he said to take immediate steps to insure we acquire the most modern capability. We agree. That is underway. We have upgraded 6050 to 6060 and other peripherals. So we are doing that.

The next recommendation said to implement the recommendations of the GAO concerning NORAD. We have, in fact everything that they asked us to do back in 1978 we can go down and document what has been done. We have implemented them to support the 427M replacement. Power upgrade, exempt NORAD from use of standard WWMCCS computers, etc. On the WWMCCS ADP, there are several GAO reports in existence. Lack of central management issue is solved. We have established a joint systems integrated office under Major General Powers for NORAD plus we have established a WIS modernization joint program office.

We have a two star Air Force General—Major General Evans—in charge of that office. There is more central management we believe.

No. 6. Review the management structure of WWMCCS project. What he really means here in the report is the WWMCCS ADP, not the entire worldwide communications system, telephone and so on, really the data processing. Strengthen the management. We believe that has been accomplished. The WIS JPM is the single focus for that organization.

No. 7, initiate an objective and independent analysis of the WIS modernization program. That is being accomplished right now.

No. 8. This one we have some problems with. He wants us, we believe, to somehow get back under this Paperwork Reduction Act of 1980. We don't understand it in the context of the report. The C^3I system such as the NORAD ADP is expressly exempt. We think that is important and we are not under that Paperwork Reduction Act and we would like not to get back under that.

No. 9, recommends that DOD submit quarterly reports on the whole program at WIS modernization and the NORAD continuing upgrades. He wants these reports submitted to these various committees including House Government Operations and Senate Government Operations Committees. We think that is a little much for us to do. We certainly remain responsive to what Congress would like us to submit to them, but we think quarterly technical progress reports to Congress and all these committees is somewhat overdoing it. We would like to recommend to you a more modified approach on reporting.

As you know, we submit an annual detailed report on the WIS modernization program right now, we have done that the last few years.

In recommendation No. 10, the report asks that GAO be given full and open access to information. That is our policy. There is a complaint they have not been given access. I am not sure what the basis is, but that is our policy.

Last, he wants the Administrator of the Office of Information and Regulatory Affairs [OMB] to review corrective actions by DOD for NORAD and WWMCCS and provide evaluation of these actions by June 1, 1982. We again do not understand that in the context that the report was written in which is NORAD ADP. It has something to do we believe with the review of this Paper Reduction Act from which we are exempt. So we are not quite sure what that recommendation meant.

Then if you look at what we have done, what General Hartinger, what the Air Force, what JCS has really done, we have an impressive set of accomplishments. First of all, the offsite test facilities established, upgraded five largest computers in the last year, added computer error detection system. Since November 1980 they have sent 75 million messages, approximately, without one error message getting out.

A computer architecture plan has been prepared. We have the diesel generators running and the uninterrupted power upgrade design completed.

That is a pretty good accomplishment.

CURRENT GAO VIEWS ON NORAD

"NORAD has instituted significant changes in its acquisition and management of computer resources. It is making excellent progress toward planning future improvements based on sound definition of requirements in overall missile warning system architectures." [Source: GAO report dated 15 May 1981.]

If you look at what GAO said in their May 5 report "NORAD has instituted significant changes in its acquisition and management of computer resources. It is making excellent progress toward planning. Future improvements based on sound definitional requirements in overall missile warning system architectures."

MAJOR MANAGEMENT INITIATIVES UNDERWAY

C^3I related.—Nuclear weapons employment and acquisition master plan; North American Air Defense Master Plan; Air Force-Tactical Warning And Attack Assessment Master Plan; and accelerated acquisition initiatives: Examples are MILSTAR, MCC, GWEN, PAVE PAWS, and OTHB.

Now where are we going in a broader sense? We have underway in the Department of Defense a major planning effort called the Nuclear Weapons Employment and Acquisition Master Plan. That is due to the President on July 1. We give him periodic monthly progress reports. We have recently completed the North American air defense master plan. The Air Force developed a tactical warning and attack assessment master plan. As I mentioned to you, there are some acquisition initiatives underway on which we are putting great stress and trying to accelerate the IOC.

That, sir, is the overview.

Senator **WARNER**. Mr. Secretary, I am impressed by that. What you have done and what you are doing is significant, yet this lingering criticism continues. What is the explanation?

Mr. **LATHAM**. I don't really know, sir.

Senator **Warner**. General Davis, while we have the opportunity here in open session there are several corollary issues I want to develop with you.

Perhaps you saw the report in the papers yesterday concerning the release of a book attributed to Marshal Ogarkov. I was struck by his comment that, in response to the military buildup on which the United States has embarked, the Soviet Union must put its military and national economy on a war footing.

Based on the intelligence briefings that we have received here it seems to me that the Soviet Union has been on a war footing for some time. I will be anxious to receive your views.

I am going to put this article in the record so that it precedes your comment.

[The article follows:]

[From The Washington Post, Thursday, Mar. 11, 1982]

SOVIET OFFICIAL URGES "WAR FOOTING" TO COMBAT U.S. GOAL OF SUPERIORITY

(By Dusko Doder)

Moscow, March 10—Marshal Nikolai Ogarkov, the Soviet chief of staff, has proposed sweeping measures to modernize Soviet strategic forces and put the country on a virtual war footing to respond to the Reagan administration's "active preparations for a nuclear war."

In a book, just published by the Ministry of Defense, Ogarkov—who is the country's highest ranking soldier—warned Kremlin leaders against any delay in perfecting Moscow's ability to "strike a devastating counterblow and destroy the aggressor under any conditions and in any given situation."

Ogarkov's warning included—and went beyond—a call for new and more powerful weapons. It called for total military preparedness not only by the armed forces and military industries but also of all sectors of the economy, the party and civil defense.

Western diplomats here said it reflected growing uneasiness among the Soviet military leaders over the Kremlin's relatively conciliatory stance toward President Reagan's military policies and his stated quest for strategic superiority over the Soviet Union.

The publication of his book would appear to place major questions of military and strategic doctrine before the Kremlin leadership, questions that, in turn, raise basic issues of allocation of resources at a time when the Soviet economy is already strained.

The changes in military technology, or as he put it, "the fast pace of the development of nuclear missile weaponry by the adversary and the possibility of their sudden use" against the Soviet Union, call for new steps "to secure the vital interests of our people."

"To understand this dialectical process is especially important at this stage when the basic scientific progress in weapons systems is renewed every 10 to 12 years," Ogarkov wrote.

"In these conditions, the failure to change views in time, stagnation in the development and implementation of new questions of military construction, are fraught with serious consequences."

He reaffirmed the Kremlin position that it would use nuclear weapons as extreme means of self-defense but the tone of his book, "Always Ready to Defend [the] Fatherland," stood in contrast to recent pronouncements by President Leonid I. Brezhnev and other Soviet officials.

Ogarkov said the Soviet Union made a mistake before World War II when it pursued a "defensive" strategy. The mistake was "corrected" in 1942 when the Soviets established large tank armies in their westward drive.

He said a new war would be a cataclysmic confrontation between the two systems—socialism and capitalism—and that it would quickly engulf all continents.

The nature of a new war with the use of nuclear weapons, Ogarkov continued, required not only military preparedness on the part of the armed forces but similar measures by the entire nation.

"In the earlier wars, the question of quick mobilization had not been clearly defined," he said. "The situation is different today. The element of suddenness played a role as early as World War II. Now it has become a factor of greatest strategic importance. The question of a timely switch of the armed forces and the entire economy to a war footing . . . [has] become sharply defined.

"In order to increase the military preparedness of the country, today as never before, it is necessary to coordinate mobilization and deployment of the armed forces and the entire economy and particularly the use of human resources, transport, communications and energy to secure the stability and livability" of the country.

He said the industries involved in arms production should "improve their cooperation" and secure autonomous supplies of water and energy in the eventuality of war. They should also establish reserves in machine tools and raw materials.

Ogarkov said the links between the economic and civil defense should be improved, describing this as "one of the most important conditions to sustain the required levels of defense capacity for the entire country."

To achieve national objectives in the new conditions of modern war, he said, "is not possible without a stable, centralized system of leadership of the country and the armed forces." It requires, he added, "an even greater concentration of management."

He said the armed forces have to improve the command-and-control system and acquire "the necesary modern technology." He called for modernization of the naval and air forces and improved training for reservists.

Ogarkov called for a decisive struggle against pacifist views among Soviet youth and also warned that the effectiveness is sometimes hampered by conscripts' failure to speak fluent Russian. This was a reference to conscripts from various national minorities.

Apparently reflecting the military's efforts to get a greater share of the budget, Ogarkov said that the need for materials now have increased "tens of times." At the same time, he said, dated equipment and techniques have to be abandoned, much in the way the cavalry was made obsolete by motorized vehicles.

Ogarkov said that Moscow's reliance on large tank forces should be "carefully studied" in view of the appearance of new antitank weapons. "To ignore this would be dangerous," he added.

He placed the main emphasis on the strategic rocket forces.

"The level of development of the socialist economy allows us to successfully resolve the most complex technical questions and develop any new type of weapon in a short period of time," he said.

"We are talking about not simply being able to defend ourselves by confronting the aggressor with the corresponding passive means and methods of defense but also to strike a devastating counterblow and destroy him under any conditions and in any given situation."

Ogarkov described the other part of the military doctrine as being political work with soldiers and the rest of the population to teach them "what is necessary to do in war to defeat a powerful and technically equipped adversary under any conditions."

He said the evolution of American strategic doctrine shows that the United States has always entertained the idea of destroying socialism. "This course has become particularly dangerous in connection with the Reagan administration's confrontational strategy and its direct and all-embracing preparations for war," he wrote.

Ogarkov sketched a picture of an encircled Soviet Union with NATO in the West; U.S. military presence in the south; arming of the Afghan rebels and "a long-term military threat" in the Far East, created by the "expansion of military and political ties between" the United States, China and Japan.

He compared Reagan's quest for military superiority with what he called similar attempts by Napoleon and Hitler. Both men failed, he said, adding that "an even more drastic finale awaits the new pretender."

General DAVIS. Senator, I would agree. One only has to look at the last 15 years of Soviet expenditures, particularly in their strategic system. The rapid development and deployment of fourth generation systems, the hardening of their strategic land-based ICBM forces, the fact that they have outspent us by at least 50 percent over the last 10 years. I don't see how they could get much more on a wartime basis than they have been on for at least the last 10 years.

Senator WARNER. So this is just, in your judgment, a little bit of publicity on their part in response to——

General DAVIS. Perhaps more disinformation.

Senator WARNER. But it is in response to the clear signal that President Reagan and others in the administration have sent?

General DAVIS. Yes. I would agree that the Soviets are concerned that the United States has set about to improve its strategic deterrent forces to include its command, control and communications and this is just another Soviet understanding of what we are doing. I think it should strengthen the American people, at least it should help them with the resolve in supporting the President's budget and the President's strategic initiatives.

Senator WARNER. General Davis, another follow-on question.

Perhaps you are aware of the opinion of some of my colleagues here in the Senate, expressed in a proposed resolution that a number of them filed this week together with a "Dear Colleague" letter. I think we all share, certainly I do, the goals of my colleagues toward the effort to stop the nuclear arms race. There is a difference of opinion, in my judgment, between myself and others on the means by which we achieve that goal.

I would like to have your comment. Perhaps you would like to supplement it after your oral comments today. We need very positive rebuttal in the record as it relates to what is commonly known as a mutual freeze on nuclear arms.

General DAVIS. Yes, sir. I appreciate the opportunity and I will supplement my brief remarks today for the record. I think we should all remember, and I am confident that the great majority of the American people understand, that in order to secure mutual reductions, realistic reductions, or a halt in the nuclear arms race, takes two nations.

One can propose unilaterally all they like, but unless the other side, in this case the Soviet Union, understands and comes to the table and cooperates and agrees with all of that, it makes little sense.

As we have discussed many times in this committee, the Soviets understand one thing, and that is power and the use of power. Once again, when the Soviets are convinced that we are going to modernize our strategic forces, I believe then and only then will they agree to come to the table and discuss in realistic terms strategic arms reductions.

I point once again to the record for the theater nuclear forces, the President's zero-based proposal, which some scoffed at and which the Soviets are now getting more interested in. We believe as we get closer to deployment of the ground launched cruise missile and Pershing II those talks will become very fruitful.

It is my opinion that the Soviets are watching and waiting to see if the Americans mean business when they talk about strategic arms modernization. Once again it takes two nations to be involved in strategic arms reductions or the halt of additional nuclear weapons.

The Soviets have given no indication that they are willing to enter into such talks with the United States.

Senator WARNER. General, let us take what they referred to as the first step and that is the freeze, and I quote it:

"The immediate strategic arms control objective of the United States and Soviet Union should, A., pursue a complete halt to the nuclear arms race."

That is referred elsewhere in the text as just a freeze which I interpret to mean that we would stop entirely two things: the upgrading of the current systems and, equally important, the modification to existing systems to improve safety. We have discussed safety before and I know how much stress you and others put on that.

So, if we are to freeze the systems as called for by this present resolution—let us talk about just safety to the American military personnel handling these weapons—what would that step mean on safety?

General DAVIS. It would mean that we would continue to operate, by and large, with weapons developed using fifties and early sixties technologies when we didn't have things such as insensitive high explosives and other safety devices that we know a lot about today.

Certain of our weapons are OK to use on alert in an international emergency, but they are in need of safety features. This does not mean that they are going to go off in your hands, but in the event of fire and other sorts of hazards you need them safe. Some of our weapons are indeed very safe. But we have embarked on a program to make our inventory much safer than it is today.

I do not want to give the impression that there is a high degree of probability of accident because there is not.

Senator WARNER. Let me see if I can restate what you have said based on my own observations and study here in the past few weeks.

In the inventory today are weapons that you say were designed and manufactured in the late fifties and sixties and due to the advancement in technology we have found a means by which to take those weapons and with relatively minor modifications just improve the safety features. This not only enures to the benefit of the military personnel handling them, but to the American citizens living in the general area where these weapons are located?

General DAVIS. That is correct.

Senator WARNER. That would not vary the megatonnage, so to speak. It does not pose a greater threat to the Soviet Union. Basically the thrust would be to improve the system in terms of its efficiency and operation and safety?

General DAVIS. That is correct.

Senator WARNER. I don't see how that fits into a concept of an arms race, just taking our inventory and modernizing it?

General DAVIS. Not at all.

Senator WARNER. Then we turn to the other subject implicit herein, namely that the newer weapons which are on the drawing board, to some extent in manufacture today, basically are smaller in megatonnage, but designed to do more specific military missions?

General DAVIS. That is right.

Senator WARNER. They are in keeping with the changing philosophy as to how we would maximize the effectiveness and credibility of our deterrent system?

General DAVIS. That is correct. They are not weapons of mass destruction.

Senator WARNER. That is very important.

General DAVIS. As we move to a strategy of war fighting they are more accurate, smaller yield, to carry out our war-fighting strategy. A freeze at this point in general terms would not leave us, the United States, in an advantageous position. It would not be in our best interest. It would also have to be negotiated with the other side. It would probably be in their best interest, but I am not sure they would be interested in a freeze at this time.

Senator WARNER. Again describing what I believe is a very legitimate motive by my colleagues supporting this; namely, to lessen the threshold of massive killing of human beings and so forth, by tying America's hands in its modernization, in its ability to have some flexibility in the means by which we use our nuclear deterrents, they are doing the very thing that they want to eliminate. In other words, mass destruction of human beings and vast cities and the like.

General DAVIS. This is correct.

Senator WARNER. Mr. Secretary, please insist on this with the Secretary of Defense, and let us get a very positive case stated so that people understand what it is we are doing in our defense posture with nuclear weapons, where we are now and where we should be going in terms of redesigning the systems to accommodate our new philosophy of deterrence.

General DAVIS. Certainly, Mr. Chairman.

Mr. LATHAM. If I might add a point, I would characterize the idea of a mutual freeze as a freeze of U.S. inferiority.

Senator WARNER. I think that is implicit.

Mr. LATHAM. I don't see how that is in the best interest of the United States.

Senator WARNER. That is destabilizing in so many areas and furthermore in my judgment it is handcuffing those who are trying to work toward a mutual and balanced arms reductions agreement.

Do any of the other witnesses today have an observation on this subject because it is beginning to generate considerable concern all the way from the small towns in America to the halls of Congress? Anyone else wish to add an observation?

General DAVIS. I believe you are right on track, Senator. We will provide additional words, but I think on the record publicly at this time the fact that we would freeze in a position of relative inferiority is the point. The central theme is that we are modernizing, making weapons much safer and moving away from weapons of mass destruction to more surgical weapons, more war fighting weapons.

[Additional information follows:]

ARMS FREEZE AND IMPACT ON START

General DAVIS. Senator, I wholeheartedly support prudent efforts to reduce the threat of nuclear war. However, under current conditions the initiative to freeze all testing, production and deployment of nuclear weapons represents a risk to our national security. While appealing from a purely idealistic perspective, this initiative represents an overly simplistic approach to a highly complex issue and disregards current military realities.

During the past decade, while the United States exercised unilateral restraint in the development and deployment of nuclear weapon systems, the Soviets maintained aggressive modernization programs to upgrade their strategic forces and enhance the survivability of their leadership and command and control elements. The total effort—clearly pointing toward a warfighting and warwinning strategy—has provided them strategic capabilities equal to, and under many measures of merit, superior to those of the United States.

A mutual freeze under existing conditions would provide no incentive for the Soviets to engage in START negotiations. They would have achieved their goal—freezing the U.S. in a position of inferiority. Not only would such a condition seriously endanger our long-term national security, it would rob us of any bargaining leverage at the negotiating table.

Current U.S. strategic modernization programs are not designed to achieve either a first-strike capability or a position of nuclear superiority over the Soviets. We are attempting to reestablish a stable balance. While the underlying philosophy of a freeze is well-motivated; it is nonetheless ill conceived. The real victory would belong to the Soviets.

Senator WARNER. I will put in the record the "Dear Colleague" letter of March 2.

[The information follows:]

U.S. SENATE,
Washington, D.C., March 2, 1982.

DEAR COLLEAGUE: Next Wednesday, March 10, we and over 50 co-sponsors in the House of Representatives plan to introduce the attached resolution calling for a mutual freeze on nuclear arms with the Soviet Union, followed by major, systematic reductions from current levels.

No greater issue faces America or humanity than the prevention of nuclear war. We agree that the United States must maintain a position of strength in national security, and we will do whatever is necessary to assure that. But we also share the growing concern of American citizens and people throughout the world that the nuclear arms race is dangerously increasing the risk of a holocaust that could destroy not only the United States and the Soviet Union, but all human life on earth.

It is essential, therefore, that the United States do all it can to stop the nuclear arms race and seek to eliminate the danger of nuclear conflict. We believe that our resolution offers the most sensible and feasible first step towards achieving this goal with full regard for our national security needs.

As you will see, the resolution requires bilateral action and agreement by the United States and the Soviet Union. Implementation of the freeze and the reductions in nuclear weapons must be carried out on a strictly mutual and strictly verifiable basis.

We know that the Soviet Union is continuing its massive buildup in strategic forces. We believe that there is no more effective means to curtail and reverse this buildup than the freeze and reductions proposed in this resolution. The endless cycle of nuclear escalation is more and more likely to end in nuclear conflagration unless we act in time to stop it.

We hope that you will join in sponsoring this resolution, so that realistic measures to reduce the danger of nuclear war will become the policy of our nation. It is time to signal to the world our determination to take concrete actions to prevent nuclear catastrophe. If you wish to co-sponsor this resolution, please contact our offices.

Sincerely,

EDWARD M. KENNEDY.
LOWELL P. WEICKER, Jr.
PAUL E. TSONGAS.
MARK O. HATFIELD.
CLAIBORNE PELL.
ALAN CRANSTON.

SENATE JOINT RESOLUTION

Whereas the greatest challenge facing the earth is to prevent the occurrence of nuclear war by accident or design;

Whereas the nuclear arms race is dangerously increasing the risk of a holocaust that would be humanity's final war; and

Whereas a freeze followed by reductions in nuclear warheads, missiles and other delivery systems is needed to halt the nuclear arms race and to reduce the risk of nuclear war;

Resolved by the Senate and the House of Representatives of the United States of America and Congress assembled,

1. As an immediate strategic arms control objective, the United States and the Soviet Union should:

(a) pursue a complete halt to the nuclear arms race;

(b) decide when and how to achieve a mutual and verifiable freeze on the testing, production, and further deployment of nuclear warheads, missiles, and other delivery systems; and

(c) give special attention to destabilizing weapons whose deployment would make such a freeze more difficult to achieve.

2. Proceeding from this freeze, the United States and the Soviet Union should pursue major, mutual and verifiable reductions in nuclear warheads, missiles and other delivery systems, through annual percentages or equally effective means, in a manner that enhances stability.

STATEMENT OF GENERAL JAMES V. HARTINGER, COMMANDER-IN-CHIEF, NORTH AMERICAN AEROSPACE DEFENSE COMMAND AND AEROSPACE DEFENSE COMMAND

General HARTINGER. Sir, in the report on obsolete computers, he is probably describing our computer system in the mid to late 1970's and not today. As I testified before the House Committee on Government Operations last May, we have made many improvements to the system so that today it can meet its mission requirements.

Another thing we have done is develop an ADP architecture plan that the Secretary mentioned which represents a blueprint of what we have today in the mountain and a road map of how we intend to continue to modernize the system over the next seven years in a very systematic modular manner.

This modernization program is necessary just to keep up with technology because new generation computers are available every 3 or 4 years. I think the bottom line, Mr. Chairman, is that the system can do its job today, and that we have a continuing improvement program to keep it updated.

Senator WARNER. Secretary Latham and General Hartinger, will you assure the public once again that during the incidents we experienced at NORAD 2 years ago the U.S. was nowhere near becoming involved in a nuclear exchange?

General HARTINGER. Just a word about the computer faults. In one case it was human error when we inserted an exercise scenario tape into the operational system. In less than 2 minutes we determined that that was false because we keep a man in the loop.

Every time there is a space or missile launch in the world, 500 last year, I have to assess whether or not it is a threat to North America. That was done in about 1 minute in this case. So there was no way that any precipitous action could have been taken.

Some of the SAC crews went to the cockpit, just like they should do, with indications that SAC had in that minute. They responded just like they were supposed to respond. But again because we have a man in the loop and there will always be a man in the computer loop to provide human judgment, in less than 2 minutes we knew exactly what had happened, it was false.

Mr. LATHAM. If I might amplify, sir, I think with the improvements that have been made in the management and technical capabilities at NORAD under General Hartinger's leadership the American people can rest assured that first of all we never were even close to any precipitous action, as the General has said, and that the system is working exceptionally well today as I have tried to outline.

General HARTINGER. We bought computers for the Off-Site Test facility so that we do not have to infringe on the operational system any more. We do all of our software and hardware testing in this facility. In upgrading the computers in the mountains, in rebuilding the diesel generators, the Office of the Secretary of Defense, the Joint Chiefs of Staff and headquarters of the Air Force in the Pentagon have all given us their complete support. We have received support for the funds we need.

Senator WARNER. Admiral, let us turn to the ELF system. Will you advise the committee on the status of this system, is the development on track and how is it being received by the various geographical locations where it is to be located?

Admiral NAGLER. Yes, sir. With the help of the committee last year ELF was improved. We have a number of receivers in submarines operating from the Wisconsin test facility. If we go into closed session later I will go into detail on the subject since it is classified.

We have found that we are completely on track for initial operational date and we expect to meet all of our schedules for 1982. I think for details of exactly what we are doing, Mr. Chairman, I would like to wait for a closed session.

Senator WARNER. How about the local politics?

Admiral NAGLER. On the local politics with your permission we have some recent letters we could enter into the record and I will just give a summary, if that is all right.

The Governor of Wisconsin wrote to a concerned citizen on February 26 and said that he is providing full support for ELF and he fully supports the President's decision. That is the Governor of Wisconsin. I want to enter that into the record.

The Marquette Chamber of Commerce in Marquette, Mich., which is where K. I. Sawyer Air Force Base and where the transfer site will go for ELF in Michigan has written to Captain Donovan, who works for me, giving complete and full support for the ELF project in the State of Michigan.

Governor Milliken, Governor of Michigan, has said on February 12, 1982, that he is very pleased with the contacts we have with the staff and how we keep them informed and keeping the staff up to date on what we are actually doing. He would like us to continue that effort in the State of Michigan.

Governor Milliken has also written to Mr. Palo, who is a citizen in the State of Michigan, and told him that while he had many concerns that had been raised in the past by the Governor of Michigan, he is now much more assured, including a dramatic reduction in the size of the proposed system from 4,000 miles to 56 miles. He is less concerned than he had been before.

Senator Proxmire in 1981 conducted a monthly news letter questionnaire in the State of Wisconsin and one of his questions that he asked was: "For years the Defense Department has been recommending that a submarine communication system called ELF be constructed in Wisconsin and the Upper Peninsula of Michigan.

The Pentagon says the system is critically important. Opponents say it is environmentally unsound and unnecessary." Sixty-one percent of those responding to Senator Proxmire's questionnaire supported the ELF project in Wisconsin.

Finally, not to keep going on too long, I would like to enter into the record along with documents cited above, an editorial dated February 24 from the Detroit News which supports ELF.

[The information follows:]

LEE SHERMAN DREYFUS, GOVERNOR,
February 26, 1982.

Mr. WILLIAM A. PALO,
Chairman, ELF Committee,
Veterans of Foreign Wars of the United States,
Flushing, Mich.

DEAR MR. PALO: Thank you for your letter concerning Project ELF as well as the enclosed response from your committee.

My first priority in evaluating Project ELF is world peace and our own national security. If the Department of Defense does not have completely reliable contact with our submarines carrying nuclear weapons, the result could be an event so catastrophic that the current debate about environmental concerns would be inconsequential by comparison. Therefore, I accept the President's decision in determining that Project ELF is necessary, and I have made this clear publicly.

Thanks again for taking the time to write and inform me of your committee's stand on the issue.

Sincerely,

LEE SERMAN DREYFUS,
Governor.

MARQUETTE AREA CHAMBER OF COMMERCE,
Marquette, Mich., March 3, 1982.

Capt. DANIEL DONOVAN,
Office of the Chief of Naval Operations,
OP-941D Pentagon,
Washington D.C.

DEAR CAPTAIN DONOVAN: On March 2, 1982 the Marquette Area Chamber of Commerce Board of Directors voted unanimously to support the installation of the ELF Communication System in the Upper Peninsula.

The decision to support the project was based on data made available explaining the system of communicating with deep running submarines and that the National Academy of Sciences has concluded a number of concerns raised over the years that SEAFARER ELF fields might constitute a source of dangerous and even catastrophic environmental contamination and health hazards connected with ELF radiation have been examined and found invalid and unwarranted.

Further, the potential economic impact that would be derived from the project during the construction phase, the testing phase, and the actual operations of the ELF project would be a plus to the Marquette County area and the Upper Peninsula.

The belief is that the ELF project is essential to our Nation's defense because international problems appear to be ever-increasing; the Marquette Area Chamber of Commerce believes ELF is essential.

With best wishes, I remain

Sincerely,

LEE LUFF,
Executive Vice President.

STATE OF MICHIGAN
Lansing, February 12, 1982.

Rear Adm. W. D. SMITH,
Director, Naval Communications,
Department of the Navy,
Washington, D.C.

DEAR ADMIRAL SMITH: I appreciate your reporting on progress of the Navy in its efforts to establish the environmental monitoring program for Project ELF.

I understand you have had frequent contact with Mr. William Rustem of my staff regarding upcoming activities of the Michigan Environmental Review Board and the Department of Natural Resources. I would appreciate your continuing to keep Mr. Rustem fully informed of your activities.

Kind personal regards.

Sincerely,

WILLIAM G. MILLIKEN,
Governor.

STATE OF MICHIGAN,
Lansing, February 8, 1982.

Mr. WILLIAM A. PALO,
West Frances Road,
Flushing, Mich.

DEAR MR. PALO: Thank you for your correspondence about the Navy's proposed Project ELF. President Reagan's decision to move forward with plans for constructing an Extremely Low Frequency submarine communications system in Michigan's Upper Peninsula and Wisconsin prompted me to take several actions.

First, I have asked the Michigan Department of Natural Resources to work with the Navy in reviewing the areas where it is proposed that the cable be constructed. Since much of the 56 miles of cable that constitute the ELF system will be placed within the Escanaba River State Forest, I am concerned that the state's management prerogatives in the area not be jeopardized.

Second, I have asked the Michigan Environmental Review Board (MERB) to review the revised proposal and determine its environmental impacts. The U.S. Defense Department has submitted an addendum to its Environmental Impact Statement to MERB. That addendum is now being reviewed by MERB.

I am awaiting the reports of both those agencies regarding their reviews.

I recognize the concern by many people in Michigan about the construction of an ELF system. It is a concern I have shared. On numerous occasions, I expressed my opposition to the larger Sanguine and Seafarer proposals. Many of the concerns I raised have been answered, including the dramatic reduction in the size of the proposed system—from 4,000 miles to 56 miles.

When the reports of the Department of Natural Resources and the Environmental Review Board are completed, Michigan will be in a position to make a fully informed judgment regarding the Navy's latest proposal.

Again, thank you for sharing your concerns with me.

Kind personal regards.

Sincerely,

WILLIAM G. MILLIKEN,
Governor.

[From U.S. Senator William Proxmire reporting to you from Washington—February 1981]

LAST MONTH'S QUESTIONNAIRE RESULTS

* * * * * * *

3. For years the Defense Department has been recommending that submarine communications system called ELF be constructed in Wisconin and the Upper Penisula of Michigan. The Pentagon says the system is critically important. Opponents say it is environmentally unsound and unnecessary. Do you support the ELF project in Wisconsin? Yes—61 percent; no—39 percent.

* * * * * * *

[From the Detroit News, Feb. 24, 1982]

OUR OPINIONS: THE ESSENTIALITY OF ELF

The USS *New York City* lay alongside the quay in Pearl Harbor, looking like an enormous, black, beached whale—360 feet long, 33 feet in diameter—and jammed with weapons and computers as well as 15 officers and 125 listed men.

A Michigan visitor is accorded special consideration, because the Navy knows how singularly important this State has become to its submarine communications system. Nowhere else can the ELF radio system, an unusual complex of transmitters and cables vital to the Navy's submarines, be built.

ELF is an acronym for Extremely Low Frequency, a network that employs miles-long antenna cables to include a signal in Laurentian Shield rock that can be received by deeply submerged submarines running almost at full speed.

The only states with the right rock formations for ELF are Michigan, Minnesota, and a tiny portion of Wisconsin. Michigan has the most rock and is the Navy's choice.

Cmdr. Ronald Koontz, who runs the communications network for the Pacific submarine fleet, says ELF is equally important for attack submarines, like the *Los Angeles*-class *New York City,* and the missile-bearing strategic subs.

At present, Cmdr. Koontz says, submarines must rise to the surface to receive messages from the Navy's complex system of shore and satellite stations. But the subs can't be summoned from the deep with existing equipment. They must come up near the surface at fixed times, usually every 12 hours.

The sub then deploys a positive-buoyancy antenna, a wire that rises to the surface and lays there where it can be easily seen. More than that, pulling the cable taut requires affixing a buoy six or eight feet in diameter at its end. This buoy roils water and emits sounds that are picked up by sonar. Then the cable is retrived with a noisy geared winch.

American submarines themselves are almost silent and therefore hard to detect—until they deploy their radio cables, which are 1,800 to 2,100 feet long.

And that isn't all. Because the buoy is large and the cable long, the sub must slow to 4 knots. Otherwise, the strain would break the cable. Thus, the boat is literally hung at the surface on its own cable while receiving messages.

Says Cmdr. Koontz: "The present existing antenna problem is more hazardous to an SSBN (ballistic missile submarine, nuclear-powered) than an adversary's attack submarines."

The speed of the *New York City* is classified, although it's known to exceed 30 knots. With the ELF system, Cmdr. Koontz notes, the boat would deploy a 400-foot neutral buoyancy antenna that neither sinks nor rises. The boat can run deep at almost top speed without parting this shorter cable.

The slow transmission rate of low frequency radio isn't a problem. Coding will increase its capacity. Its major merit is that it can advise a deeply submerged sub that there are no messages, and thus no need to surface, or it can order the sub to surface at an irregular time to receive longer messages on other systems with greater capacity.

There is a further consideration. Communications and guidance systems can be wiped out for long periods by interference with the electromagnetic spectrum. Nobody knows which of the systems would survive in a nuclear exchange. ELF, it's thought, may be the one system that could deliver a signal through such interference.

Adds Cmdr. Koontz: "We must have ELF."

He's right.

Senator WARNER. Admiral, is there any reason to believe that the ELF system, once deployed, will interfere with our civilian air traffic control communications?

Admiral NAGLER. No, sir. That has recently come up. We recently responded to Congress on that. If you will give me a second, Mr. Chairman, I would like to submit that, for the record; that is absolutely false.

The question is: "It has been alleged that the Navy's ELF communications system transmission will interfere with air traffic control frequencies."

The Navy's answer is: "This is categorically untrue. The Navy's extremely low frequency (ELF) system currently operates at a frequency of 76 hertz which is close to ordinary electrical power systems which operate at 60 hertz. Air traffic control uses frequencies between the very high frequency (VHF) (30 to 300) megahertz, voice transmission band and the 2,700 to 2,900 megahertz band used for ground control radars.

"Other navigation and control equipment use frequencies in between. These air control frequencies are many orders of magnitude higher than the ELF frequency. Studies have shown that even the most sensitive aircraft equipment would have to be closer than 150 feet to a transmitting ELF antenna to be affected by either the electric or magnetic field from the ELF antenna.

"As the present Wisconsin antenna and the planned Michigan antenna will be miles from any airfield, there will not be any effect from ELF transmissions on air traffic control or aircraft equipment."

Senator **WARNER**. Admiral, the GAO report of last November was critical of the ELF system. I presume this is classified. In some place you have noted the views of the Department of Navy with respect to this report. Is that correct?

Admiral **NAGLER**. That is correct. We have made a side-by-side comparison on each statement of the GAO report. Some we agree with, some we disagree with.

We have submitted that to the Secretary of Defense. It is my understanding that the Secretary of Defense has submitted to the GAO our reply. I will be happy to provide that for the record if you so desire.

Senator **WARNER**. I don't want to put this voluminous thing in the record, but I suggest a summary of the major points be put in this record so that we have some rebuttal to the points raised.

Admiral **NAGLER**. May I get that clarified? A summary of the points we disagree with?

Senator **WARNER**. I do want acknowledgment of the existence of this GAO report and the Department of Navy's basic rebuttal to it in summary form.

Admiral **NAGLER**. We shall do that.

[The information follows:]

NAVY POSITION ON GAO ELF REPORT OF NOVEMBER 30, 1981

The GAO report was written in response to five specific questions which focused on known limitations in the proposed ELF communications systems. This direction resulted in a report of limited scope and depth. Its content reflects a lack of understanding and value appreciation of submarine command and control operational procedures and requirements in support of current national strategic policy. These deficiencies degrade the quality of the report and limit its utility. The following summarize key criticisms of the report:

The scope and depth of the inputs are insufficient to validate its findings. The report does not recognize the contribution of ELF to the strategic C^3 or reflect the value judgement and the opinions of senior military and DOD officials which support the need for the system. The findings and recommendations from a comprehensive Navy review of strategic connectivity which document the requirement for and prioritize the value of ELF in relation to other submarine C^3 needs are not included.

It's the GAO's position that Navy has not quantified the cost effectiveness of ELF. They indicate that the benefits of the ELF system have not been quantified and compared against the capabilities, costs, and risks of other C^3 improvements or alternates. In response to this criticism, it should be noted that the Navy and OSD have conducted extensive separate reviews of strategic and submarine C^3 requirements, systems, and needs to quantify the value of the system. The present ELF plan was value-assessed and prioritized in its importance with other systems. While the GAO report acknowledges the basic utility of ELF for SSBN use it fails to consider additional benefit gained from use in SSN applications.

The GAO assessment fails to grasp the important advantage of extending submarine command and control capability to deep operating depths. The report reflects a lack of understanding and appreciation of operational procedures required to maintain effective submarine command control while minimizing the operational constraints imposed by shallow antenna depths. [Deleted].

The GAO report states that a lack of known or projected threats is the primary reason not to deploy the system. While the current capability of a potential enemy to detect our strategic submarines is limited, there is no assurance that this limitation will not diminish with time. Therefore, communication systems which require an antenna at or near the surface, and which restrict the submarine's operating profile increase the potential for detection. [Deleted] ELF is such a system.

The development of an ELF communications capability as now proposed is needed and affordable. It will complement and improve the effectiveness of submarine command and control and add a new dimension of operational capability. The ELF communications system will also provide continued insurance against an unforeseen technological breakthrough which might degrade the survivability of our most important sea based strategic missile system.

Senator WARNER. Now Admiral Nagler, will you describe for the committee the central reasons behind the Navy recommendation that the TACAMO mission be upgraded by the acquisition of new aircraft?

Admiral NAGLER. Yes, sir. May I check to see about one classified item to see if I can disclose it in open session?

Senator WARNER. Yes, surely.

Admiral NAGLER. I will keep this unclassified, Mr. Chairman.

The current EC-130 TACAMO aircraft is about 20 years old and it has served the Navy extremely well in providing strategic activity to our fleet ballistic missile submarine force. However, we need to upgrade the speed and the on-station time of the TACAMO aircraft.

The current EC-130 operates overweight or close to overweight operating condition today. In some cases we cannot provide all the fuel that should go on the aircraft. There are many upgrades that are going on the TACAMO aircraft which the current aircraft cannot use.

I will be happy to discuss any of those details of those upgrades in closed session if it is your desire.

In addition, the TRIDENT op area is a larger op area than our current submarine op area, which stresses the aircraft even more. There are a number of EC-130s that at the current approved force level must be increased for the new TRIDENT op areas if we retain the EC-130's.

If we buy a new type aircraft we can decrease the number of even the EC-130's currently required and the overall life cycle cost will be cheaper and it will do the job more effectively.

Senator WARNER. General Dickinson and General Hartinger, would you, for the record, provide what your experience has been as a consequence of the enactment in the 1982 defense authorization bill of the new flexibility to your respective areas in the acquisition of data processing equipment? Has this statutory relief been of assistance to you? Is it still the desire of the Department of Defense to have the benefits as provided by the 1982 bill? Or do you want to go back to the old system?

General DICKINSON. We will be happy to do so, Mr. Chairman.

[The information follows:]

General HARTINGER. The objectives of the 1982 defense authorization bill have assisted NORAD in its on-going modernization and upgrade planning. To continue to exercise the flexibility for computer equipment will allow us to get the required capability when we need it. To go back to the old system would have an impact on our on-going systematic, modular modernization approach.

Senator WARNER. Or the third alternative, do we need some more legislation? Do you need some more flexibility?

I should like to add also: Can such streamlining be accomplished through improved DOD management and regulations? In other words, once we have the law in effect will the internal regs enable you to do what you want to do?

[The information follows:]

STREAMLINING THE ADPE ACQUISITION PROCESS

General DICKINSON. I wholeheartedly concur in and support the DoD initiatives in ADPE acquisition and insert our coordinated position for the record:

Thus far, DoD has accomplished the following regarding the 1 December 1981 legislation:

On February 1, 1982, the Deputy Secretary of Defense designated Dr. Richard DeLauer, Under Secretary of Defense (Research and Engineering), as the Senior Defense Official for all matters in the context of your initiative, now included as Section 2315 of Title 10, United States Code. In that memorandum, Mr. Carlucci also issued interim DoD-wide criteria for acquiring ADPE and ADP services under 10 U.S.C. 2315.

These interim criteria went into some detail to describe the categories of exclusion from the Brooks Act, as we understand the language, without either expanding or contracting the coverage we believe you intended. Mr. Carlucci's direction further stated that the Under Secretary (Research and Engineering) should make the determination, in coordination with the Assistant Secretary (Comptroller), as to which process would be followed if the guidelines left any doubt as to whether P.L. 97-86 or P.L. 89-306 applied. To date, there has been no request for clarification.

Dr. DeLauer has directed in a 16 February 1982 memorandum that a small high-level working group be formed to review the guidelines and to revise them if necessary to assure that the process is indeed streamlined. He set the deadline for this action as July 31, 1982.

To date, over thirty system augmentations or upgrades with a combined life cycle cost exceeding $150 million are being processed consistent with the Congress' mandate. These include intelligence and command and control systems as well as weapon systems support such as missile range instrumentation and software support subsystems. We will establish a simplified tracking system to measure our performance under the revised structure.

However, the "procedural" mindset is already changing to a "mission" mindset where procurement serves to satisfy mission needs at reasonable prices. Executive Order 12352, Federal Procurement Reforms, will assist this effort and ensure the objectives of your amendment are accomplished.

At this time, we do not believe further specific legislation to be required. As you know, there are a host of regulations, both within the Department and in the oversight process, which have been emplaced in the last 15 years to cover this activity. We do not wish to overreact and throw out the baby with the bath water. Where the existing management process is sound, we wish to draw from it. Where our internal procedures are at fault we will clean them up. We believe that, by and large, streamlining can now be accomplished through improvement of the DoD and Service management and regulations.

Senator WARNER. I am now referring to page 19 of the report entitled "23rd Report From the Committee on Government Operations." It says as follows:

> After a decade of more poor planning and mismanagement our Nation's warning system is seriously deficient. Attention must be given to resolving the problem of NORAD by the Secretary of Defense. However, the problems of NORAD are not easily resolvable now. In short, even if NORAD received the most modern technology it will be incapable of using it for at least another 2 years.

Perhaps you can comment in part on that now and then further for the record. That is a report dated March 8, 1982. Are you familiar with it?

General **Hartinger**. Yes, sir. In 1970, NORAD was directed to buy WWMCCS standard computers. The Commander in Chief of NORAD at that time wrote a letter saying it was not wise. However, the standard WWMCCS computers were procured. These business machines required development of very complex executive software. We changed the business machines through extensive software modification to real time processing computers that work well today.

The exemption from WWMCCS standard computers means that we don't have to take those types of acquisition actions any more. I am not sure of the context of that statement because we have upgraded the computers and the management situation at NORAD has changed as reported in the May 15, 1981 GAO report.

Senator **Warner**. You may well disagree and if that is the case I would like to have it on this record.

General **Hartinger**. I will submit it for the record, sir.

[The information follows:]

General **Hartinger**. I do not understand the statement concerning NORAD being incapable of using modern technology within two years. We are in fact using modern technology today and have a coherent, systematic approach for continued modernization of the NORAD computer systems.

Senator **Warner**. Any other comment from panelists?

Mr. **Latham**. Yes, sir. I might try. I am not quite sure what Mr. Brooks is up to in that report as I mentioned earlier.

The point is that the mountain has upgraded five of those machines this year compatible to the new process as I pointed out in the briefing. I am not sure what his point is. We have been able to accept and put in the mountain very modern and brand new processors. I don't understand 2 years to do something with modern technology. We will try to give a more definitive answer.

Senator **Warner**. The most recent SAR indicates that the DSCS-III program has experienced a cost growth over its cycle of $758 million in a program originally expected to cost $893 million. What are the reasons for this cost growth?

Mr. **Latham**. The reason for that was that when they finally developed the production bid for the DSCS-III satellite the real costs were finally understood. As you know, the initial development contract procured three satellites. In fact, one was a model which will be refurbished for launch. Then we asked for proposals for the fourth and fifth satellites. The prime contractor was in fact quite shocked when he found out that the subcontractor bids for various parts had increased substantially. So part of it was a substantial increase in the piece parts in the satellites.

The second factor that caused this to go up was inflation.

Third, the original program estimated back in the early days of the program as to what the "should cost" should be for the entire buy of the satellites was frankly underestimated.

That is it in a nutshell. There is no other excuse.

Senator **Warner**. General Davis, last year your predecessor, General Ellis, cited as one of his top priorities the acquisition of three more E-4B aircraft. In Congress, the budget this year, the program is no longer a priority item for the Strategic Air Command. Are there reasons for that?

General DAVIS. Yes, Senator. When the connectivity staff got into high gear last year we went to all of the nuclear CINC's who have command posts, the current EC-135's that are almost 30-years old. The motion earlier to buy additional E-4's, that is, to continue to buy because they were already in production really didn't take account of the operating cost and the endurance. They are extremely expensive to operate.

We are modifying the aircraft now from E-4A's to E-4B's, to harden them. They suited the purpose at the time, but what we need as a future worldwide airborne command post is not an E-4, but a far more fuel-efficient airplane that all the nuclear CINC's can operate well into the next century and that takes advantage of the latest advances in technology.

When I polled the nuclear CINC's they all agreed that we should get a more fuel-efficient airplane, an airplane with more capability, and advanced development is currently underway in the Air Force. That is, we are stating the requirement, coming forward with the requirement. It is simply too expensive to operate that large airplane.

Senator WARNER. Addressing the question to the entire panel, to what degree would appreciable savings be realized in the TACAMO looking glass of CINCPAC, CINCLANT command posts by securing of common aircraft?

General DAVIS. If I may comment, that is the purpose of our development program. That is, all the nuclear CINC's have stated the requirement, their requirement for an airborne command post and we are underway in developing that now.

I would have to defer to Admiral Nagler on the issue of the ECX. Such a worldwide airborne command post might be too large and expensive to meet his requirement.

Senator WARNER. TACAMO is an important element in this because of the numbers involved.

Admiral, do you have any comments.

Admiral NAGLER. Yes, sir. We have looked at the TACAMO trying to combine it with the airborne command post. As General Davis said, the size might be one problem.

There are two problems, the TACAMO operating areas are much different from the command post operating areas. I would like to expand on that in closed session.

The other problem is that the TACAMO aircraft must be configured to work with a trailing wire antenna, many miles trailing from the stern of the aircraft which must also orbit. We don't think that rules out command post, but their missions are not compatible.

We are still studying the problem to see if we cannot try to come up with the same airframes. At the present time we do not see where the missions are compatible.

Senator WARNER. My last question in open session is addressed to each panelist. This question originated with General Ellis a few years ago when he fought hard for the enhancement of the C^3 system.

The question is: Do you have priorities this year in the C^3 area, like those identified for the committee last year by some of you, which are not in your personal judgement sufficiently addressed in the fiscal year 1983 budget?

General **Davis**. Senator, as the Director of the Joint Strategic Connectivity Staff and with membership represented from all the nuclear CINC's, I believe the 1983 program is a balanced program. I believe the priorities are just about right.

I do want to thank the committee for their support last year and the addition of $341 million which has certainly helped us. I feel very confident that we are on our way to where we should be. It is going to take a long time. But to sort through the priorities and give you a definite answer, I need to consult with my colleagues, the other nuclear CINC's. I will be happy to provide that for the record if it is any different from what I have just said.

Senator **Warner**. General Dickinson?

General **Dickinson**. Sir, we believe that the need to improve survivability of the strategic C^3 system has been very well addressed in the 1983 budget in the order of first priorities first. We can't do everything in any given year and I agree with General Davis, that thanks are due to the committee for putting us on the road last year. I believe the most important thing we need now is not funds above the 1983 request, but consistency over the next several years to be sure that the program that was defined in the past year is continued and not fragmented. It must be addressed as a system.

The system approach of this committee has been very refreshing, a great help to us.

General **Davis**. If I might add one thing, Senator Warner, the question of advanced GPS continues to be raised from time to time. As I wrote Chairman Tower last year, I support it wholeheartedly and the Air Force for their part has put the money where their mouth is.

We consider NAVSTAR GPS essential. Mr. Latham's briefing reflected that, The IONDS portion of NAVSTAR GPS is vital to overall connectivity. The fact that we have money, thanks to the committee, in 1982 and 1983 for hardening the IONDS package is ample demonstration that we support wholeheartedly NAVSTAR GPS.

Senator **Warner**. Mr. Secretary, I know from my own experience in budgets you probably fought for more money. Therefore I recognize it is more difficult for you to answer this question than the others, but would you care to provide your views?

Mr. **Latham**. Yes, sir. We actually made out extremely well in this budget process, and not just in strategic, but across the entire spectrum of theater and tactical as well.

We were given a very good hearing by the Defense Resources Board and the Secretary in particular paid quite a bit of attention to us.

So I think I would second what these other gentlemen have said that we have a balanced program and the priorities are pretty much as we are able to address them.

There is one program on which we did have a minor oversight. Where we could certainly use some more money and I will point that out to you in the closed session. This was my mistake more than anything else. Other than that we are in good shape.

I second what General Davis has said about the GPS/IONDS program. It is very vital to us.

General HARTINGER. As Strategic Defense Commander I particularly noted the difference in support, the great support from you and your committee. The President's strategic modernization program specifically supports strategic defense. The Secretary of Defense just approved our air defense master plan. So, it is the first strong support we have had in our area in over 20 years.

Now we have funded programs in all three of the mission areas, air defense, space defense, and missile warning.

Senator WARNER. Admiral?

Admiral NAGLER. I will echo what my colleagues have said, Mr. Chairman. Your work on the 1982 budget started us in the right direction. In the Navy you raised us 25 percent on C^3I. The Navy through its review and through the OSD review kept that momentum in the 1983 budget. I feel very confident that the 1983 Navy C^3 budget is well balanced and is pointing us in the right direction.

General HARTINGER. Sir, could I add one thing. I forgot to mention last August the House Armed Services Committee had hearings on supporting our air defense efforts in the country and that helped too.

Senator WARNER. Gentlemen, that is a good report.

At this time the Chairman is going to ask your indulgence. Would you and your staff collaborate with both majority and minority staff so that when we go into closed session we can quickly put together the record that we feel is necessary?

Thank you very much.

[Whereupon, at 9:50 a.m., the subcommittee recessed, to reconvene in executive session at 10:27 a.m.]

EXECUTIVE SESSION

Senator WARNER. We will now go into closed session and cover the points which you feel you should put in the record.

We will start off again with Secretary Latham.

Mr. LATHAM. I thought I would show you two additional Vugraphs to give you an idea of the difference between our capability and the Soviets' endurance. This summarizes our status and theirs in hardened command centers. We have [deleted] they have [deleted]. They have missile command bunkers, nearly [deleted]. There are over [deleted] additional hardened facilities of enormous extension. We are not sure exactly what functions they serve, but they number a total of [deleted] of very hard, capable command and control facilities for a wide variety of ministries and military.

Senator WARNER. I have a question on that. Of course, the word "hardened" is one that is completely relative. You can throw a few sandbags on something and that is technically hardened. Now, hardened to what extent?

Mr. LATHAM. From the [deleted].

The exact calculations of the vulnerability number I don't know, but the estimate is that they are in at least the [deleted] psi, if you want to use that terminology, up to [deleted] psi. These are not fallout shelters; these are hard bunkers [deleted].

The estimate is, for example, they have enough hardened bunkers and facilities in the Soviet Union to shelter the entire membership of the Communist Party without any question.

Senator WARNER. Let us work with that a little bit. My recollection is about six (6) percent of the population of Russia are card-carrying Communists; is that about right?

Mr. LATHAM. Yes, sir.

Senator WARNER. Is that about correct?

Mr. LATHAM. Yes, sir.

Senator WARNER. You talk in terms of civil defense?

Mr. LATHAM. In terms of being able to put these people into hardened underground bunkers dispersed throughout the Soviet Union. Every ministry has an alternate hardened bunker facility of enormous extension. For example, we just discovered another one for the [deleted] he has a large complex which has a lot of aboveground facilities and underground there is a very extensive command post [deleted].

In addition, in another location we found he has an additional facility that is semihard, not deep underground, but it appears to be hardened with [deleted].

The same thing is true of the [deleted]. There is a recent report on that. They have not just one but several underground hardened facilities with [deleted] so that they can operate the [deleted] which they have today, from those underground facilities, with [deleted].

They have done one thing the Germans didn't do. The communications lines do not run along the rail lines; they are separated so if you sever the rail line you don't cut the communications lines.

In every aspect of their superstructure they have built a very surviving and enduring capability, so if they go first, which is the assumption, and they have gone to a dispersal of their leadership and battle staffs, they have them all over the place, with good communications.

Senator WARNER. Let us pause here a minute. This is the type of information that—and I believe that I say this in all modesty—I and other Members of Congress could use very effectively in rebutting the type of resolution submitted last week for a freeze because we have to go after this in designing our strategic deterrent forces and you need special weapons, rather than those great big blockbusters. Isn't that precisely the type of thing that we need, new weapons to do the surgical work?

General Davis. That is right, to go after the [deleted].

Mr. LATHAM. If you look at the number of facilities that we would need to [deleted] It is not a simple [deleted] at all.

Forgetting the silos and submarine basins. [Deleted.] I don't know whether this could be declassified or not. [Deleted.]

Senator WARNER. All you have to do is deal with the rhetoric. We don't have to have the precise numbers. We have a small fraction of the hardened sites. We are not after the Soviet population. This appeals, understandably, to the emotions in the United States now, but we are after those military persons who are trying to destroy the world and they are buried beneath the ground. In order to deter them from contemplating the initiation of an attack you have to have a weapon that can get the precision and go in and take out the hardened sites?

Mr. LATHAM. Yes, sir. Most of these are in fact away from population centers.

Senator WARNER. That is the point. See if you and the generals can collaborate and give us what you can.

[The information follows:]

OFFICE OF THE UNDER SECRETARY OF DEFENSE,
Washington, D.C., March 24, 1982.

Hon. JOHN W. WARNER,
U.S. Senate,
Washington, D.C.

Dear Senator WARNER: The attached material responds to your query concerning Soviet leadership survivability. They clearly intend to endure throughout all phases of a nuclear conflict.

Your interest in and support for strategic force modernization, and in particular your recognition that C3 modernization is an inextricable element of that process, is greatly appreciated.

Sincerely,

DONALD C. LATHAM,
Deputy Under Secretary of Defense.

Attachment.

SOVIET ACTIVITIES IN NUCLEAR SURVIVABILITY AND DAMAGE LIMITATION: IMPACT ON THE STRATEGIC BALANCE

A. INTRODUCTION

Although previous US administrations have tended to view the strategic balance in terms of mutual assured destruction (MAD), a review of the Soviet literature reveals that they do not share this perception. Their literature has been discussing nuclear war in terms of survival and damage limitation for many years.[1] This disquieting fact raises a sequence of critical questions:

What is the Soviets' perception of possible protracted nuclear war?

What steps have the Soviets taken in the areas of survivability and damage limitation to support this perception?

In light of these Soviet initiatives in survivability and damage limitation, what is an appropriate response for this Administration to pursue?

SOVIET PERCEPTION OF PROTRACTED NUCLEAR WAR

In their military writings, Soviet military theorists are generally vague about the likely duration of general nuclear war. Although they generally postulate that such a war would be relatively short, they often caveat that assumption with the observation that a world war could be lengthy because of the enormous military and economic potential of the US and its NATO allies. These Soviet military theorists generally conclude that significant advantage would accrue to the side that had been able to maintain military reserves and the means to employ them. In order to realize this objective, three requirements must be satisfied: the government infrastructure must be protected; large standing general purpose forces must be maintained; and large reserves of arms, equipment, and raw material must be assembled. This brief paper focuses on the Soviets' initatives to satisfy the first of these requirements.

SOVIET INITIATIVES IN LEADERSHIP SURVABILITY AND WARTIME MANAGEMENT

In support of their doctrine, the Soviets are implementing a comprehensive system that is designed to provide continuity of leadership, protection of essential work force personnel, and flexible, redundant control of strategic and conventional assets throughout all phases of conflict.

In the area of leadership survivability, the Soviets are pursuing efforts on an impressive scale. Throughout the USSR, hardened underground shelters have been constructed that could protect approximately 110,000 key government and management personnel. The perceived distribution of these protected personnel is summarized in Table 1.

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[1] See, for example, K. B. Payne, "Deterrance, Arms Control, and U.S. Strategic Doctrine, ORBIS, Vol 25, No. 3, Fall 1981.

TABLE 1.—*Shelter capacity for U.S.S.R. government/management Personnel*[1]

Category:	*Est. shelter capacity*
Key party/government officials	5,000
Lower level leaders	63,000
Managers of key installations	2,000
Members of civil defense staffs	40,000

[1] "Soviet Military Capabilities," HQ SAC, July 1981.

In some instances, these blast-resistant shelters are estimated to be capable of withstanding at least 1,000 PSI blast over-pressure. As an illustration, shelters with that level of hardening would be able to survive a one megaton warhead that impacted 1,600 or more feet from the facility.

More broadly, the Soviets plan to protect essential work force personnel via in-place blast shelters and dispersal of off-shift personnel to relocation sites outside of likely target areas. It is estimated that about 12-24 percent of the work force could be sheltered at key industrial installations.

In the military sphere, existing evidence indicates that protective facilities developed for Soviet leaders at all levels exist primarily to insure continuity of command/management functions throughout all levels of conflict. These facilities provide physical protection of leadership cadres and the requisite C^3 systems to support command or management responsibilities during all phases of a nuclear conflict.

In addition, the Soviets have taken major initiatives to insure continuity of control over naval and mobile land forces. In the area of naval forces, selected submarines and cruisers have been reconfigured with extensive redundant capabilities for communicating with fleet headquarters as well as with the Naval Commander-in-Chief based in Moscow. In the area of land forces, mobile C^3 systems have been fielded for virtually every level of command in the Soviet armed forces, providing them with an extensive, redundant system that can be used to control their forces for an undetermined amount of time. The Soviets' mobile signal units provide the backbone of this system, with back-up provided by airborne command posts.

In summary, the Soviet program goes far beyond the concept of sheltering a small number of leaders in order to survive a one-time major nuclear exchange. They are creating a militarized system of wartime national administration that is able to support the execution of military operations, wartime economic management, and recovery.

D. RESPONSE TO SOVIET INITIATIVES

It is vital that we recognize the Soviets' military doctrine and their initiatives in nuclear survivability and damage limitation as they exist, not as we wish them to be. This does not mean that we are choosing a war-fighting strategy over a deterrent strategy. However, if we cannot cope with Soviet war-fighting capabilities, we will have a weak deterrent and a serious susceptibility to nuclear blackmail. The strong deterrent that we seek requires that we be able to survive successfully all strategies that the Soviets are capable of pursuing.

In order to accomplish this we must improve the capability to control U.S. forces throughout crisis situations up to and including nuclear war; improve the capability, survivability and endurance of strategic offensive forces, C^3 systems, and intelligence resources; protect the U.S. population in order to reduce risks of coercion and blackmail; and counter Soviet capabilities and initiatives by exploiting their weaknesses. To achieve these objectives this Administration has fashioned a strategic force modernization program which consists of five mutually reinforcing elements. The first and perhaps most critical element of this program is the provision of enduring C^3 to link our forces to the National Command Authorities at all levels of conflict. By pursuing this initiative we will be taking an important step towards rectifying what has been a largely unaccommodated imbalance in our ability to support wartime national administration and thereby enhance the deterrence value of our forces.

Mr. **Latham**. I thought I would show you one other thing, how extensively the Soviets will use techniques to survive their strategic command aircraft. [Slide deleted.]

This is an overhead photography picture. I am not sure you can see it too well. These are Bears; these are not Backfires. This is a paved strip here in this area. This is a field, just plain dirt. These are Bears sitting out here. They have driven them off into that side area. This is not a main operating base. There are no above-ground facilities here. [Deleted.] So, one of the tactics to survive and endure their airborne systems is to go to an extensive dispersal posture like this and then reconstitute at a base which has the weapons and fuel, keep these minimally loaded and fueled at some dispersed base and fly to a base where they reconstitute, where they bring weapons and food and fuel and reconstitute their air arm, be it a strike arm or an airborne command post or what have you, and they practice this.

This is just to give you some samples of what we are coping with.

[The prepared statement of Mr. Latham follows:]

PREPARED STATEMENT BY DR. DONALD C. LATHAM, DEPUTY UNDER SECRETARY OF DEFENSE (COMMUNICATIONS, COMMAND, CONTROL AND INTELLIGENCE)

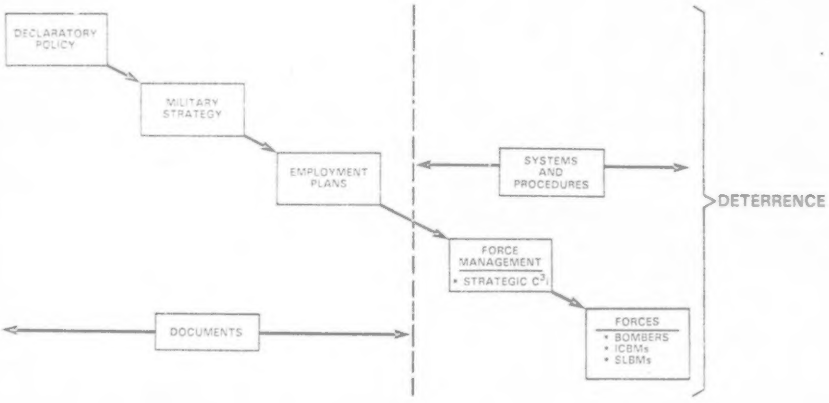
STRATEGIC COMMUNICATIONS, COMMAND AND CONTROL (c^3)

I. Introduction

Thank you for the opportunity to discuss Communications, Command, Control and Intelligence programs in DOD. Today you will hear about the major initiatives that the Department of Defense is taking to implement President Reagan's decision to modernize the strategic command, control and communications (C^3) system. I will not discuss the strategic intelligence program or other intelligence programs; however, let me assure you that we are addressing C^3 and I together as a systems package in support of all our forces and the National Command Authority.

Let me begin by describing for you how the strategic C^3 systems relates to our deterrent posture, and how the acquisition programs for strategic C^3 in the fiscal year 1983 budget request fit together to support achievement of needed improvements and new capabilities to strengthen the deterrent.

A SYSTEMS PERSPECTIVE OF DETERRENCE



As depicted in the diagram in Figure 1, the credibility of our strategic deterrent depends on a perceivably strong linkage between:

our declaratory policy for deterrence of nuclear conflict;

military strategy and force employment plans for implementing that policy, and the forces, and means to manage them, needed to execute the plans.

Regardless of how cogent our statements of policy for deterrent may be, the credibility of our strategic deterrent is flawed if there are perceivable weaknesses in the rest of the chain. Such weaknesses can arise because of changes in policy, because of changes in strategy to respond to increases in the capabilities of our potential adversaries, or because of increased threats to the strategic forces and the supporting C^3 system. A combination of these factors necessitates modernization of the strategic C^3 system.

Strategic C^3 the essential link for translating employment plans into mission capability, and is therefore a critical element of deterrence. For a credible deterrent, the strategic C^3 system must of itself be absolutely credible, because its purpose is to support and enable implementation of the gravest decisions that any President may ever have to make. The system must retain that credibility under ths most severe stresses imaginable, and it must retain the capability to implement force employment decisions—made in accordance with national security policy—under those stresses. Further, the C^3I system must be endurable under repeated stresses be they direct or indirect forms of attack, spoofing or deception.

II. The fiscal year 1983 budget request

A. *Budget Analysis.*—For the fiscal year 1983, Department of Defense is requesting $2.8 billion for strategic C^3 programs. This request supports four functional areas of strategic C^3.

surveillance sensors and associated processing facilities and equipment, for attack warning and damage and strike assessment;

command and control centers, [deleted].

communication systems for linking the sensor system to the command centers, [deleted] for conveying execution and termination orders to the forces, [deleted] and

information systems to expand battle staff capabilities for management of [deleted] data, operations planning, situation assessment and [deleted] and to facilitate communications.

As shown in Figure 2, [Fig. 2 deleted] well over half of the fiscal year 1983 Strategic C^3 budget request—64 percent—is for investment: procurement and construction of new equipment and facilities, and research, development, test and evaluation for new capabilities.

B. *Basis for the Strategic C^3 Budget Request.*—There is no question that this is a rather sizeable bill, and I want to explain how the Department arrived at the overall program that we are asking you to support.

Last spring and summer, by direction of President Reagan, the Department conducted a high-level review of the strategic C^3 system. This review addressed, comprehensively and in depth, the capabilities and deficiencies of the current strategic C^3 system. In addition to the hardware elements of the system, the review examined the strategic C^3 process, on an end-to-end basis—including sensor functions, communications and decision-making, and aspects of the process that are unique to individual legs of the strategic triad—in short, all of the elements that must work if the system as a whole is to function as intended. Where possible, procedural changes were identified to work around potential shortcomings in equipment capability. Threats to the strategic C^3 system were examined in detail, and the capabilities of the current system and relevance of on-going and proposed modernization initiatives for meeting those threats were assessed. This "Strategic Connectivity Review" resulted in a report to the President last August.

These assessments were, [deleted]. The conclusions and recommendations of the review were endorsed by senior representatives of the Services, Joint Chiefs of Staff, and the Office of the Secretary of Defense.

The findings of the Strategic Connectivity Review were subsequently addressed during the Department's program and budget reviews in the context of strategic force needs. The resulting program for modernization of the strategic C^3 system was thereby formulated in balance with the program for strategic weapons modernization. As a result, the President's announcements, on October 2, 1981, of the strategic modernization program included, with the highest priority, the modernization of strategic C^3I as a major element of that program.

The threats that the strategic C^3 system must deal with and our strategy for meeting the threat are important and will be described next. Then, the strategic C^3 process and highlights of the acquistion initiatives for reinforcing it will be presented. We need your support for strengthening the essential elements of that process.

III. Meeting the threat

A. *The Offensive Threat.*—The growth in the strategic nuclear capabilities of the Soviet Union has been widely publicized. By all the conventional measures, the consequences of the substained and intensive Soviet programs for development and deployment of modern weapons are impressive. We cannot rationalize, on grounds of military needs, such growth in terms of a need perceived by the Soviet Union for a single massive strike capability. The growth and composition of Soviet forces, the evolution of their force management capabilities, and other initiatives—such as their continuing investment in active defense systems, and extensive civil defense measure—lead to the inescapabale conclusion that they are building to achieve the capability to conduct regional and global nuclear campaigns. Soviet efforts to [deleted] are of particular concern. These programs appear to support a strategy based on the premise that the side with preponderant residual offensive force management capability following a series of exchanges in most likely to achieve a conclusion of the conflict on terms favorable to that side. [Deleted.]

B. *The Threat to Strategic C^3.*—As was mentioned earlier, the strategic C^3 systems must be capable of functioning under conditions of great stress. A top-down list of the major stressing functions is shown in Figure 3.(F/G 3 deleted.)

One very important aspect of that stress stems from the extreme compression of time [deleted].

The first evidence of an irrevocable commitment to attack occurs [deleted]. During this period, the warning information must be assessed and confirmed, [deleted]. The orders for execution must be transmitted to the forces. All of this must happen within a very short period.

However, the strategic C^3 system can be stressed by enemy actions before the actual destruction of facilities and communication links. Jamming of sensors and communications could begin [deleted]. These stresses can of course recur during subsequent attack, but they are most dangerous during the critical initial reaction phase.

As a consequence of the initial attack, fixed terrestrial facilities, communication links, and non-alert airborne elements may be destroyed, and [deleted].

Following the inital attack, major threats to the strategic C^3 system include radioactive fallout [deleted] severe turbulence and dust clouds from nuclear detonations [deleted] and trapped electrons in space [deleted]. In addition, surviving command staffs will initially be confronted with major uncertainties [deleted].

To a great extent, these uncertainties stem from the fact that the effects of a major nuclear attack on the strategic C^3 system can only be calculated—there being no way to simulate them realistically in exercises—and the empirical data on which such calculations must be based are severely limited in both scope and scale. Such uncertainties would also affect the Soviet strategic C^3 system, [deleted].

Our overall strategy to meet the threat to the strategic C^3 system must emphasize endurance as well as survivability, including [deleted] capabilities to wage a multiple-exchange campaign.

IV. The strategic C^3 process

It is appropriate to describe the strategic C^3 process in three parts. First, peacetime operations will be described. The second part deals with the highly compressed period leading to our initial response to an attack. Finally, the elements needed to accomplish force management for follow-up strikes will be discussed.

A. *Peacetime Operations.*—During peacetime, as shown in Figure 4, (Fig. 4 deleted) the Strategic C^{3}I process entails operation of the intelligence information systems which provide strategic warning. Constant assessments are made of data from tactical warning systems, which serve to provide notification that an attack had been initiated. Command and planning staffs [deleted] and conduct exercise of the total C^3 network. These elements of the strategic C^3 process will be strengthened by acquisition of a family of modern computers and information transmission networks. The Worldwide Military Command and Control System (WWMCCS) Information System (WIS) modernization program will expand the capabilities of strategic battle staffs to maintain current force status information, [deleted] and evaluate exercise results. In addition, the Strategic Air Command (SAC) Digital Network (SACDIN) will replace aging elements of the SAC communications network to provide timely transfer of mission data and other messages from SAC Headquarters to bomber and missile forces, and to support maintenance of up-to-date force status and other data bases at SAC Headquarters.

Furthermore, we are making major investments to improve the tactical warning sensors and supporting communications and data processing. [Deleted.] We are also procuring mobile ground terminals to reinforce the fixed processing sites in peacetime [deleted]. We are also expanding the PAVE PAWS phased-array radar network for detection of SLBMs [deleted]. Finally, we are initiating major improvements in our air-attack warning capabilities through a long-range program which includes acquiring modern ground-based line-of-sight radars, over-the-horizon radars for long-range all-altitude airspace surveillance, and airborne warning and control system (AWACS) aircraft.

B. *The initial phase of strategic conflict.*—As shown in Figure 5 (Fig. 5 deleted), the initial phase of strategic nuclear conflict, from the U.S. standpoint, would commence with detection of ballistic missile launch activity. This function is accomplished by [deleted] which use infrared sensors to detect the signatures of the booster engines. It is impossible to overstate the importance of this capability to strategic deterrence [deleted].

On receipt of [deleted] warning messages—[deleted] of launch activity—[deleted] the information from these sensors serves to refine the assessments of attack size and objectives—for example, whether our ICBM forces are under attack.

[Deleted.] This capability will be significantly improved with deployment of the Integrated Operational NUDET Detection System (IONDS) aboard NAVSTAR Global Positioning System (GPS) spacecraft. The GPS/IONDS system attains initial operational capability in [deleted].

If the process to this point is interrupted for any reason, [deleted].

Each leg of the strategic Triad presents unique problems with respect to communication of strike orders, [deleted].

For example, we are taking steps to increase the assurance that the [deleted]. We are therefore providing satellite communications for the bombers and procuring very low frequency/low frequency (VLF/LF) receivers [deleted].

During and after the initial attack, terrestrial communication links to the ICBM forces are at risk. [Deleted.] We are therefore procuring Defense Satellite Communications System (DSCS) III satellites to provide super-high-frequency links to the launch control centers. [Deleted.] The DSCS III satellites will also be significantly [deleted] than existing communications satellites.

[Deleted.] Survivable communications to the SLBM force is provided today by the NAVY's TACAMO fleet of EC-130 [deleted] communications relay aircraft. These aircraft are being hardened [deleted]. In addition, we are deploying a two-site extremely low frequency (ELF) communications system to strengthen pre-attack connectivity to the SLBM forces.

C. *The follow-on phase.*—[Deleted.] we are building upon the current system in an evolutionary manner.

There are important differences between strategic C^{3}I for the [deleted].

Figure 6 [deleted] depicts the major elements of the strategic C^3 process after the process shown in Figure 5 has been completed. It depicts a cyclic process, [deleted]. The follow-on phases commence with [deleted].

[Deleted.] I will remind you that at this point, it is likely that the fixed command facilities such as the NORAD Headquarters in Colorado, SAC Headquarters in Nebraska, and the National Military Command Center in the Pentagon, will have been destroyed, as will have many elements of our peacetime communications networks, and many of our air bases. The strategic airborne command posts, such as the SAC Looking Glass aircraft, will survive because they are mobile, but [deleted]. To provide a sustaining complementary capability, we are initiating a major development program for Mobile Command Centers (MCCs). The airborne command posts will endure long enough to ensure continuity of command through the transition from the initial phase to the follow-on phases, and then the covertly deployed MCCs could take over to provide the command and control functions indicated in Figure 6.

[Deleted.]

Reconnaissance and strike missions [deleted] will require a common navigation and position-fixing grid and precise timing information for accurate target location, route planning, and weapon delivery. The NAVSTAR Global Positioning System will provide this very important support function, in addition to serving as the host spacecraft constellation for IONDS.

In the area of communications support, we are pursuing several initiatives. The first step will be continued deployment of DSCS III satellites, which will be [deleted].

For the longer-term, however, we are looking to a new satellite communications system—MILSTAR—to provide greatly improved connectivity to the forces during peacetime as well as survive to support both the [deleted] nuclear conflict. MILSTAR will be the first real capability we will have to [deleted] provide greater assurance of connectivity [deleted] MILSTAR will be the first satellite communications system designed from the outset to serve both tactical and strategic users, to be resistant to both electronic and physical attack, and to have the endurance characteristics needed to support the management of strategic forces in a multiple-exchange campaign.

The final communications initiative I will describe is intended for direct support to the C^3 reconstitution process, although it will also serve in other ways. Advances in packet switched communications technology will now support deployment of [deleted]. The network is designed to be able to [deleted].

V. North American air defense

Our initial efforts to ensure active defense were announced by President Reagan on October 2, 1981, and focused on modernization of the North American Air Defense system. The Department has developed, with Canadian participation, a Master Plan for that effort [deleted]. The Master Plan, however, provides a framework for the evolution of the air defense system [deleted]. In addition to the warning system enhancements mentioned earlier, the Master Plan includes replacement of 1960's-vintage F-106 aircraft with F-15 fighters; the latter are far better matched to the current and future threat, as well as the airspace surveillance capabilities that are being acquired.

VI. Summary

The brief descriptions I have provided of the strategic C^3 process and key programs to support the evolution of that process do not fully reflect the intense analytical and planning efforts that led to the President's decision to improve our strategic C^3 capabilities in balance with strategic force modernization efforts and the comprehensive set of initiatives for which the Department is seeking Congressional support in fiscal year 1983. What I have tried to portray today is the total architecture for an evolutionary strategic C^3 system, one that is enduring as well as survivable. That portrayal has necessarily been at a large scale. While we have not yet made the final decisions on the preferred solutions to all of our problems in strategic C^3, I believe that the programs for which we are seeking your support will contribute in a very real way to the credibility of our strategic deterrent.

Senator WARNER. Now, let us go to each panelist.

General Davis, will you start off? Are there any additional things you want to put in?

General DAVIS. Just to say, Senator, once again that I think the initiatives that we have underway in terms of strategic connectivity, the dollars provided last year both by the committee and by the budget, have us on our way.

For instance, in the Strategic Air Command, we are shielding and EMP hardening our command posts and we are going to do the same with the additional dollars at each of our bomber command posts, [deleted].

Senator WARNER. Let me interrupt at that point to bring out another area on which I need help from you for this rebuttal.

This basic disparity in hardening has occurred in the last decade, has it not?

General DAVIS. That is right.

Senator WARNER. In other words, our weapons in inventory today are 1950's to 1960's, whereas the hardening was a 1970 to 1980 project and there is a mismatch between our weapons inventory and the hardening?

General DAVIS. When we first started observing how the Soviets were going about [deleted]. Then they discovered exactly what they were doing. They started out [deleted].

So, they started out hardening all of their systems.

As we have learned more and more and gotten smarter, as Mr. Latham pointed out, we figured out what they were doing [deleted]. When we saw the extensive nature of their effort, then we knew [deleted].

You need a mix of weapons to do that.

Senator WARNER. Thank you, and I appreciate your allowing me to interrupt. I hope, Mr. Secretary and General Davis, you can get your thoughts on this; the material to me in a week's time.

I am concerned with the pace at which this is moving.

General DAVIS. Yes, sir.

Senator WARNER. There is a case to be made—we have covered the points here—one which is understandable to the American people if put out in logical fashion?

General DAVIS. Yes, sir, and we certainly will do that. Back to the improvements in C,^{3} [deleted] depending on which system you look at [deleted].

The committee provided the connectivity for our strategic Triad in terms of ELF, funds for additional FLTSATS to replace our decaying SATCOM satellites across the board, I think the committee recognized our problem, as we had come in later days to recognize it. We believe we are on the road to recovery; but it won't happen overnight. [Deleted.] But on a daily basis, my connectivity staff in conjunction with Mr. Latham, with the C^3's best people, General Dickinson, are able to make progress.

Thank you, sir.

[The prepared statement of General Davis follows:]

PREPARED STATEMENT BY GENERAL B. L. DAVIS, DIRECTOR, JOINT STRATEGIC CONNECTIVITY STAFF JOINT CHIEFS OF STAFF AND COMMANDER IN CHIEF, STRATEGIC AIR COMMAND DIRECTOR, JOINT STRATEGIC TARGET PLANNING STAFF, JOINT CHIEFS OF STAFF

INTRODUCTION

Mr. Chairman and Members of the committee: I welcome the opportunity to appear before this committee as the Director of the Joint Strategic Connectivity Staff (JSCS) to discuss the status of strategic connectivity and its importance to national security. As you know, I am also CINCSAC and Director of the Joint Strategic Target Planning Staff (JSTPS). As director of the JSCS, it is my responsibility to monitor and analyze strategic connectivity systems and make recommendations to the Chairman, Joint Chiefs of Staff (CJCS) concerning hardware and precedural improvements that will enhance strategic connectivity. The JSCS is assigned in this task by representatives from each of the nuclear-capable Commanders-in-Chief (CINCs) and key defense agencies.

I want to thank this committee for its support of our attempts to improve strategic connectivity during the past year. Several vitally needed C^3I improvements recommended by the Department of Defense (DOD) in testimony to this committee a year ago were funded in the fiscal year 1982 appropriations.

My remarks today will cover recent accomplishments and initiatives, progress on implementing last year's Joint Strategic Connectivity Staff recommendations, and recommended solutions to critical connectivity deficiencies.

Let me begin by explaining what is entailed in strategic connectivity. It includes those warning and command control systems which provide the National Command Authority (NCA) with the capability to execute, terminate, and manage the strategic nuclear forces through the pre-, trans-, and post-attack phases of a war. The need for survivable and enduring connectivity to support our national policies is our underlying concern.

The elements of strategic connectivity and their functional interrelationships become more clear by reference to this chart (Figure 1).

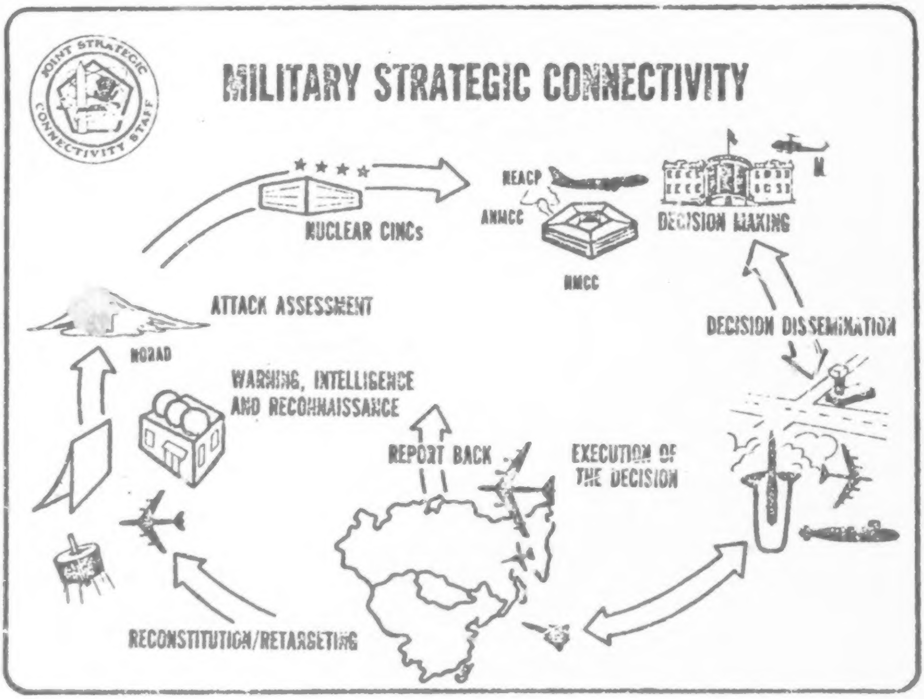

JOINT STRATEGIC CONNECTIVITY STAFF
MILITARY STRATEGIC CONNECTIVITY
NUCLEAR CINCs
NEACP
ANMCC
NMCC
DECISION MAKING
ATTACK ASSESSMENT
NORAD
DECISION DISSEMINATION
WARNING, INTELLIGENCE AND RECONNAISSANCE
REPORT BACK
EXECUTION OF THE DECISION
RECONSTITUTION/RETARGETING

FIGURE 1

The strategic connectivity network begins with the North American Aerospace Defense Command (NORAD) tactical warning and attack characterization systems.

When tactical warning is received from satellites and ground-based radars, NORAD analyzes the attack, characterizes the threat, and provides the most current information available to Washington, D.C. and certain other locations.

Once the NCA receives the information, he must weigh it, evaluate response options, and reach a decision. The time available to reach a decision is critically limited due to the short flight time of Submarine Launched Ballistic Missiles (SLBM). The NCA decision is then properly formatted and disseminated to combat units via an Emergency Action Message (EAM). The numerous components of the National Military Command System (NMCS) and the CINCs' static and airborne command posts are key links in this dissemination process.

Following execution of the NCA decision, the National Military Commanders (NMC) require feedback on the damage that has been inflicted upon our adversary, his remaining capability, and the resources we have remaining to continue the war.

Finally, we need survivable and enduring communications in the trans- and post-attack period to reconstitute and retarget our surviving forces.

I will turn now to some examples of what we are doing to improve the survivability and endurance of our strategic C^3I systems.

ACCOMPLISHMENTS/INITIATIVES

Currently, the Department of Defense is focusing its efforts on correcting the most critical connectivity deficiencies. [Deleted.] We—DOD, the CINC's, OJCS, and the technical community—are working closely to develop and implement the Groundwave Emergency Network (GWEN), an austere radio teletype system. Although it has a limited capability, it can be deployed in the near-term and will upgrade our connectivity assurance within the Continental United States (CONUS).

In a nuclear stressed environment, GWEN will provide high confidence that we retain the connectivity required to convey to the NCA/decision-makers minimum tactical warning information along with CINCNORAD's assessment of its validity. It will also carry the decisions—in the form of Positive Control Launch (PCL) and the initial Single Integrated Operational Plan (SIOP) execution message—directly to the forces. The initial system will survive long enough to deliver the necessary warning and "get the word out." We are all striving to keep the system simple to avoid additional "nice to have" features which appear reasonable but drive up the cost and delay deployment. A thin CONUS-wide network is expected to be in use in 1984.

NORAD has published a directive which clearly explains the [deleted] with emphasis on the importance of proper maintenance procedures to preserve the required level of protection.

[Deleted.] This will provide CINCSAC with a more survivable connectivity with his forces in the event of high altitude detonations. Also, [deleted]. We have one B–4B now.

JSCS has worked closely with the SIOP CINCs to make the best use of their existing Airborne Command Post (ABNCP) assets. Because of their mobility, [deleted]. They must be operated as an integrated system to provide the most utility. This implies choosing operating areas which give the best connectivity for all the SIOP forces, not just for one segment. To this end, the Joint Chiefs of Staff have taken initiatives to establish a single operational manager of the system. This will provide a cohesiveness which has been lacking in the past.

Another initiative of great importance is the replacement program for the Worldwide Airborne Command Post (WWABNCP) system. The purpose is to replace the aging fleet of BC–135 aircraft (which were built in the late 1950s) with a new aircraft capable of operating from shorter airfields, with more endurance and less maintenance support. It will have lower fuel consumption—a very significant factor in both day-to-day operations and the the post-attack period when fuel would be at a premium. [Deleted.] Each of the SIOP CINCs have stated a requirement for such an aircraft. The Air Force is currently in the process of establishing a program to support the stated requirements.

Additionally, the CINCs, JCS, the Office of the Secretary of Defense (OSD), and the Defense Communications Agency (DCA) with JSCS, are defining a long-range 1990 objective architecture for strategic C^3. After the appropriate users have agreed to this objective architecture we will ask DCA to provide the necessary technical planning support necessary to transition from where we are today to where we want to be by 1990.

PROGRAMMATIC STATUS OF C^3I

Last year, testimony to this subcommittee identified [deleted] shortfalls in the strategic connectivity network which required funding for correction. The C^3I funds

Congress approved in fiscal year 1982 were an essential step toward enhanced strategic connectivity in the out years (1985 and beyond). Important programs include:

Procurement of three additional FLTSATCOM satellites to preclude an ASFSATCOM satellite gap.

A significant start on the development of a new architecture multi-mission satellite, the Military Strategic and Tactical Relay Satellite (MILSTAR) for enhanced two-way worldwide communicatons. [Deleted.]

Initial funding for the proposed Groundwave Emergency Network.

Continued development and deployment of improved LF/VLF radio systems for the Air Force and Navy.

Improvements to the tactical warning network through procurement of critical long-lead items [deleted] and initial site engineering for the Southeast (SE) and Southwest (SW) PAVE PAWS radars.

EMP hardening for the critical ground and airborne command centers.

The fiscal year 1982 support of this subcommittee and Congress for upgrading our C^{3}I network is appreciated. These vitally needed programs will provide major improvements in connectivity. However, this cannot be a one-time effort. Your continued support is essential to insure that these C^{3}I improvements are brought on line. For the future, close attention is required to insure that C^{3}I is an integral part of any follow-on weapon system. The accuracy, flexibility, and survivability of any proposed new weapons systems can be totally compromised without the requisite C^{3}I.

FYDP IMPROVEMENTS

The Five Year Defense Program (FYDP) contains some of the C^{3}I programs which are specifically aimed at improving the strategic connectivity network. I will now discuss the contribution of these programs and the remaining shortfalls in our Tactical Warning/Attack Assessment (TW/AA), Command Centers, EAM dissemination, and enduring capabilities.

As the discussion proceeds, [deleted].

An evaluation of the performance of the present TW/AA system is shown in the chart [deleted]. The chart time line is in non-specific minutes to hours. Specific TW/AA functions, with today's capabilities, are shown in white; no capability is shown as a darkened area. [Deleted] and physical destruction resulting from SLBM/ICBM impacts on the CONUS.

[Deleted.] Of course, when the SLBMs and ICBMs begin to impact, the radars themselves will be destroyed. This is only one scenario. Our focus, for this and all functions of strategic connectivity, must be on all scenarios to prevent any possibility of a weakness being exploited.

The projected capability of the TW/AA system after the FYDP improvements is shown in this chart [deleted]. [Deleted]. However, the Integrated Operational NUDET Detection System (IONDS) does provide post-attack damage assessment information based on its detection of nuclear detonations.

[Deleted.] Its endurance is limited by the availability of runways, logistics support, and crew.

The evaluation of command center capability with FYDP improvements is shown in this chart [deleted].

[Deleted.] Several alternatives are under investigation, including an Extremely High Frequency (EHF) package on FLTSAT (scheduled for launch in the 1986–1987 time frame) and the use of MILSTAR to solve this problem.

An evaluation of the current EAM dissemination capability is shown in this chart [deleted]. We have included the PCL of the bombers on this chart because it is a function very necessary to the survival of those aircraft. As you can see, [deleted].

[Deleted] those systems designed to support EAM dissemination before physical destruction continue to provide some connectivity. After the SLBMs and ICBMs begin to impact, these EMP survivable systems are drawn down, further reducing connectivity.

An evaluation of EAM dissemination capability with the FYDP improvements is shown in this chart [deleted]. Given timely tactical warning and a decision by the NCA, the FYDP improvements will greatly enhance our capability to assure the execution of the strategic forces. [Deleted.] Their continued funding is critically important.

To this point, I have discussed strategic C^3 capabilities in terms of our ability to respond to an attack on the CONUS. Recently, we have begun to evaluate our capability to survive and conduct operations in a protracted conflict. This chart [deleted] is an evaluation of our present capability to maintain a war fighting command control posture after a deliberate attack on the CONUS. Please note that the time line on this chart is in terms of days, weeks, or months. As you can see, [deleted] as a result of the limited airborne reconnaissance and strike reporting resources which survive.

The improvements in the FYDP, when fully implemented, will enhance enduring connectivity. Such systems as IONDS will provide greatly needed damage assessment. Many other systems are in the early stages of research and development, and their endurability and the extent of their ability to contribute to connectivity throughout a prolonged conflict cannot be predicted with precision. It is clear that they will result in an improvement, but [deleted].

To conclude this discussion of the impact of the FYDP improvements on strategic connectivity, four points deserve special emphasis:

Your continued support of these programs is essential if we are to obtain the required improvements just discussed.

A survivable and enduring command center capability is vital [deleted]. The present OSD effort to develop a Nuclear Weapons Employment and Acquisition Master Plan will provide additional information in this area. In the meantime, we must continue our efforts to obtain a replacement system [deleted].

[Deleted.] Additional evaluation is needed to define the permanent fix.

There should be a single C^3I focal point in DoD with direct access to the Secretary of Defense. He should be in control of policy, programs, requirements, and resource management. A single manager is required to protect essential on-going programs, filter out unworkable solutions, and decide when to stop studying and start producing and implementing the necessary fixes. A single focal point would, I believe, enable us to move forward much more effectively in correcting the deficiencies and providing the necessary modernization to deal with the increasing threat in a way that is consistent with our national policies. The DoD single focal point would be the enforcer of the master plan as it pertains to C^3I.

CONCLUSION

The demands placed on C^3I in a nuclear conflict, especially a protracted nuclear conflict, are as stringent as those placed on the forces themselves. In the past, C^3I systems have not received the attention they deserved. Although they account for a relatively small fraction of total expenditures, these systems are critical to the effective deployment of all strategic systems.

The vital importance of C^3I to the national security was asserted by President Reagan on 2 October 1981 when he said, and I quote: "I have directed the Secretary of Defense to strengthen and rebuild our communications and control system, a much neglected factor in our strategic deterrent. I consider this decision to improve our communications and control system as important as any of the other decisions announced today. This system must be foolproof in case of any foreign attack." End quote.

Mr. Chairman, I am in full accord with the President's statement.

No area of strategic modernization should have higher priority than C^3I improvements. To realize the full potential of modernized weapons systems in each of the military services, we must make corresponding improvements to the C^3I systems that support them. The fragile nature of our current C^3I network demands that this all-important aspect of national security receive close and continuing attention.

Thank you.

Senator Warner. Are there any other panelists who want to discuss this before we go to the briefing?

All right, General Dickinson.

General Dickinson. Mr. Chairman, I have submitted my statement for the record and will not go through that statement. I will present a view of how the system will improve over the next few years, which will give you some idea of what the support this committee and the Department of Defense have given us will achieve.

[Chart deleted.]

I will use these basic diagrams in two parts: One part the incoming system from the sensors into the command post, and the other part for the outgoing systems from the command post to the nuclear forces. I will go through them year by year to explain how those systems improve in two sets.

First will be those improvements that let us survive the first minutes of an attack, even before the destructive bursts on the ground come in, through the period of high altitude burst with the electromagnetic pulse and various atmospheric disruptions and magnetic field interruptions, the jamming periods, and the destruction as the SLBM's begin to arrive from outside the country toward the inside.

Next I will explain those things that contribute to greater endurance and help us to use our secure reserve more efficiently.

[Deleted.]

To move quickly through the years, emphasizing some of the significant changes, [deleted] we replace this DSCS-II satellite [deleted] much more capable than we had before.

We get [deleted] connectivity from the groundwave system. It is a very important system. [Deleted.]

The E-4B's you have supported will be flying continuously, continuously available for the Presidential airborne command center and [deleted] has been added to other parts of the ground system.

In [deleted] we increase the number of nodes significantly in that groundware network. We deploy mobile command centers and we have mobile terminals that will link the satellite information with the users.

We expand the SLBM launch area coverage with the operation of the PAVE PAWS site covering the southeastern area and we have additional [deleted] protection coming in for our command posts.

[Deleted.] We have the southwestern coverage of the launch area with the second new PAVE PAWS and we have additional groundwave nodes and more [deleted] coming in.

We have very major improvements in our [deleted] which will not be dependent on facilities that can be destroyed [deleted].

By [deleted] big improvements are realized. You see [deleted].

[Deleted.]

Now, the outbound connectivity providing conferences among the command centers and communications to the forces.

Currently the hardened UHF satellite, AFSAT, [deleted]. By [deleted] as I mentioned during the previous discussions, we get the SHF satellite communications, the DSCS [deleted].

By [deleted] some of the bombers begin to get their LF and VLF receivers, improving their connectivity in the strike environment. TACAMO aircraft in the Pacific are replaced [deleted].

In [deleted] the EC-135 fleet of the airborne command centers and radio relay aircraft are [deleted].

Now I will change categories and talk about those capabilities [deleted]. These are in addition to some of the improvements previously mentioned. These items give [deleted].

[Deleted] we get very significant improvement here with our mobile command centers, the groundwave emergency network, tying the command centers and with the information sources.

The upgraded command post E-4B and remote ground terminals bring the sensor satellites down to the [deleted].

By [deleted] the multiple mobile ground terminals are deployed.

The multiple mobile command centers and airbone command posts provide the facilities that will [deleted].

In the outgoing part of the system, I have discussed the capabilities that improve [deleted]. There are very substantial changes in capabilities and [deleted].

But that is why we say it must be a systems approach and it must take consistent support over a period of years to make this happen.

[The prepared statement of General Dickinson follows:]

PREPARED STATEMENT BY LT. GEN. HILLMAN DICKINSON, USA, DIRECTOR, COMMAND, CONTROL AND COMMUNICATIONS SYSTEMS, ORGANIZATION OF THE JOINT CHIEFS OF STAFF

Mr. Chairman and members of the subcommittee:

I. Introduction. I appreciate the opportunity to update you on our progress in strategic command, control and communications (C^3) programs since the hearing last year. Today, I will review our method for prioritizing strategic C^3 improvements, discuss briefly programs which continue the subcommittee's initiatives of last year and discuss the expected improvements in strategic connectivity based on the fiscal year 1983 Department of Defense (DOD) request and the supporting five year defense program (FYDP). But first, I would like to draw an analogy between the human organism and a military system. The human body consists of a number of sensors that receive stimuli as the body encounters its environment. The nervous system that transfers information between the brain and the sensors and limbs, the brain that operates to make decisions and provide functional signals to the limbs thereby causing the fists and legs to respond to the stimuli. Our military systems operate in a similar manner. Figure 1 provides a graphic comparison of the human body and a military system. Command, control and communications include sensors (not entirely unlike the eyes, ears and nose of the Human Body), command centers (which provide decisions and direction like the brain), and communications linking sensors with command centers and command centers with the combat forces (very much like the body's nervous system). No living organism successfully evolved when these parts were far out of balance. Throughout my tenure as director, C^3 systems, I have placed significant emphasis on this systematic view of command, control and communications. This subcommittee has been a pioneer among congressional organizations in recognizing the need to examine the system in determining what parts need to be strengthened in order to provide a balanced system.

II. Prioritization. As you may recall, last year I presented a series of charts depicting specific strategic C^3 capabilities, the timeframes during which these capabilities are required and the environment associated with each timeframe. Figures 2 through 4 [deleted] show the three categories of priorities with generic capabilities required along with the timeframe during which those capabilities are required and the expected environment during that timeframe.

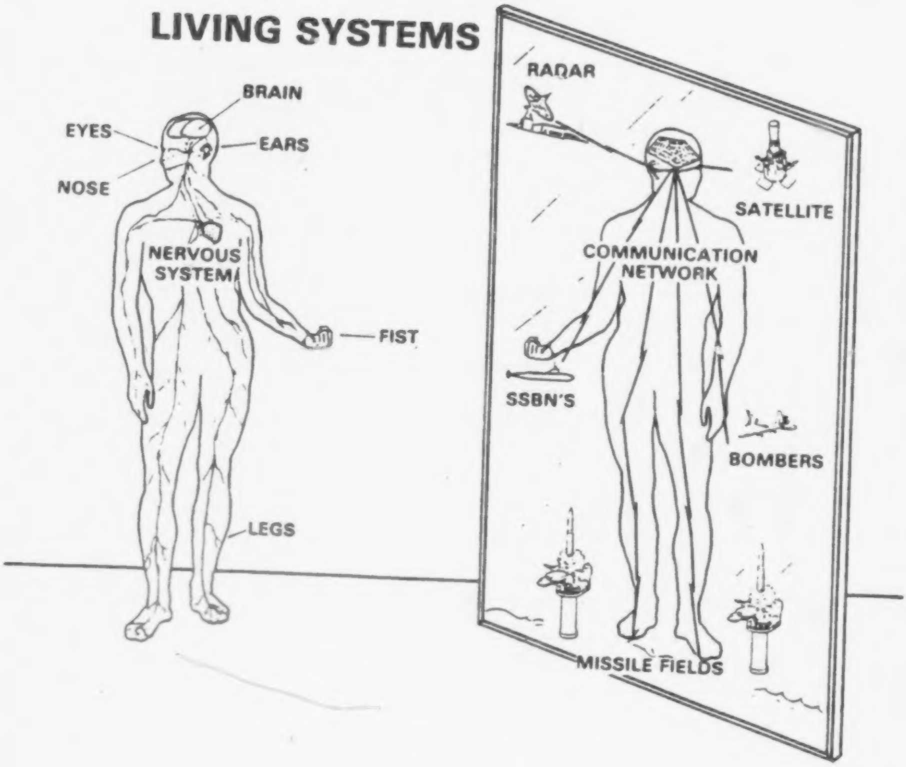


FIGURE 1

The highest category of priorities is to insure credible system operation during peacetime, to provide unambiguous warning during the very early stages of a nuclear exchange and to insure connectivity between the National Command Authorities and the Strategic Forces. (Fig. 2 deleted.) This category establishes a system which cannot be decapitated and hence represents the essential C^3 for a minimum level of deterrence. The second category of priorities supports endurance, better use of the secure reserve, and reconstitution. The capabilities required and the timeframes associated with the second category are shown in (Fig. 3 deleted.) The third category of priorities focuses upon providing more accurate assessment of the attack. Figure 4 (Fig. 4 deleted) shows the capabilities and timeframes for this third category.

The prioritization by category of capability and timeframe remains unchanged since last year.

III. Subcommittee initiatives. Subsequent to last year's hearings, this subcommittee made eighteen specific recommendations to increase the DOD request for strategic C^3. Table 1 lists the initiatives along with the subcommitee's recommendation and the final appropriation for each incremental initiative.

TABLE 1

FISCAL YEAR 1982 FUNDING INCREMENTS

	SASC RECOMMENDATION		DEFENSE APPROPRIATION
PAVE PAWS EXPANSION	3.8	(71.0)*	3.8
COMMUNICATIONS PROPAGATION THROUGH SCINTILLATION EFFECTS	5.6		5.6
PAVE PAWS TESTING	1.0		0
EMP HARDENING-CRITICAL FACILITIES	1.8	(5.2)*	.2
PACCS EMP HARDENING	2.0		0
SATELLITE COVERAGE CONTINUITY	0	(92.0)*	65.0
MILSTAR (EHF)	61.2		56.2
IMPROVED TACAMO	0		0
PAVE PAWS POWER UPGRADE	0	(23.0)*	0
VLF/LF IMPROVEMENTS	5.6		0
DSP GROUND STATION POWER/COOLING	1.0		0
ELECTRICAL POWER MODERNIZATION PROGRAM	.88		.5
MGT #6	0	(32.0)*	0
ERCS	6.8		0
DISTRIBUTED MISSILE CONFERENCE	2.0		0
AFSATCOM SECURE VOICE NETWORK	10.0	(4.5)*	0
AIRFIELD LOCATORS	0	(5.0)*	0
SURVIVABLE, ENDURING COMMUNICATIONS	7.0		0

* RECOMMENDED APPROPRIATION NOT REQUIRING AUTHORIZATION

During the development of the fiscal year 1983 DOD budget, we followed these particular initiatives very closely to assure that the progress begun by this subcommittee was sustained. Table 2 lists the same eighteen initiatives and indicates the level of funding requested in the fiscal year 1983 DOD budget to continue these efforts. For example, procurement funds for Pave Paws expansion recommended by the subcommittee, but not appropriated, are included in the fiscal year 1983 DOD request. These initiatives along with the C^3 initiatives included in the President's strategic modernization announcement last October, have done a great deal to alleviate the concerns we expressed last year in achieving the capabilities associated with the first category of priorities. The second category of priorities includes some of the initiatives in the President's program such as the Mobile Command Center, while other initiatives remain to be defined and validated. We will be continuing the efforts to refine programs in the second category of priorities. Relatively less has been done on the third category.

TABLE 2

FISCAL YEAR 1983 SUPPORT FOR FISCAL YEAR 1982 SASC INITIATIVES

	FY 82	FY 83
PAVE PAWS EXPANSION	3.8	72.0
COMMUNICATIONS PROPAGATION THROUGH SCINTILLATION EFFECTS	5.6	**
PAVE PAWS TESTING	0	0
EMP HARDENING-CRITICAL FACILITIES	.2	1.6
PACCS EMP HARDENING	0	13.7
SATELLITE COVERAGE CONTINUITY	65.0	231.3
MILSTAR (EHF)	56.2	123.9
IMPROVED TACAMO	0	29.0
PAVE PAWS POWER UPGRADE	0	0
VLF/LF IMPROVEMENTS	0	14.7
DSP GROUND STATION POWER/COOLING	0.6	**
ELECTRICAL POWER MODERNIZATION PROGRAM	.5	15.6
MGT #6	0	89.3*
ERCS	**	**
DISTRIBUTED MISSILE CONFERENCE	0	.5
AFSATCOM SECURE VOICE NETWORK	0	0
AIRFIELD LOCATORS	0	0
SURVIVABLE, ENDURING COMMUNICATIONS	0	2.4

* FUNDS PROCUREMENT OF SETS 4, 5 and 6
** NO FUNDS REQUIRED

IV. Strategic connectivity status. There are numerous DOD programs which will significantly enhance strategic connectivity over the next several years. Figure 5 (Fig. 5 deleted) is a schematic diagram of strategic connectivity as it exists today connecting the threat sensors to the command centers in order to provide the warning. Figure 6 is a diagram of strategic connectivity among the command centers of the decisionmakers for response formulation and connectivity from the decisionmakers to the strategic forces.

These two diagrams form the basis for a presentation, which I will make, that demonstrates how the programs in the DOD strategic C^3 fiscal year 1983 request, as supported by the five year defense program, will provide evolutionary improvements in strategic connectivity over the next five or six years. Strategic connectivity capabilities will continue to improve in an evolutionary manner as current DOD strategic C^3 programs are implemented. Significant efforts are underway to examine options for additional endurance of strategic connectivity and we expect that they will also be implemented as evolutionary improvements.

V. Conclusion. Generals Davis and Hartinger have testified to the specific needs. Vice Admiral Nagler and Brigadier General Prather have discussed the programmatic status of key strategic C^3 programs which will contribute to overall strategic connectivity. I have reviewed our priorities for evolutionary improvements and will show you how we can expect the system to perform over the next several years as the hardware is fielded, from a systems point of view. Your support in the past has been invaluable, and I urge you to continue to support these programs which are critical to our national security.

Thank you.

Senator WARNER. Thank you, sir.

Generally speaking, the situation here in the Nation's Capital is such that there is no way we can defend ourselves effectively against a cruise missile attack from a Soviet submarine; isn't that about right?

If he inititates the first strike and ASW in its preliminary phase is unsuccessful, what protection do we have?

General DAVIS. The submarine-launched ballistic missile is going to come down either from high altitude burst——

Senator WARNER. I am talking about the cruise coming here to the Capital. We are talking about the Soviets having their ministries buried in a groundhog hole compared to U.S. capabilities. I am asking about the dangers of an attack with little or no warning.

General DAVIS. [Deleted.]

Senator WARNER. I don't know anything that technology can do unless we have some sort of anti-cruise missile system that will knock those things down the moment they come out of the submarines.

Mr. LATHAM. You could use terminal defenses. If he is armed with nuclear warhead, the keep-out zone is substantial. If you had a terminal defense around the Capital it really would not suffice. For example, the Patriot system, depending again on the cross section of the cruise missile, could successfully engage a subsonic and even a supersonic cruise missile if the detection range is adequate. The problem is that [deleted].

The problem is to get him outside the zone of the destruction, which means you have to engage him well out at sea. That is not right now in the cards.

Senator WARNER. We don't have any plans either?

Mr. LATHAM. Except that you would make every effort to keep that submarine well away from the coast.

Senator WARNER. In international waters he can come in 12 miles.

Mr. LATHAM. I am not sure what we would do if he gets in that close.

Senator WARNER. Admiral Nagler?

Admiral NAGLER. We estimated [deleted].

One of the things we looked at—and I believe it is ongoing now—is to [deleted].

Mr. LATHAM. There is a point that the Secretary has been mentioning in his testimony recently: If there is absolutely no warning whatsoever, that is a case someone could discuss, but we would expect there would be some strategic warning.

The problem is, [deleted].

The question is, how will we react to that warning? Assuming that we have some [deleted] then you can mitigate the damage from a tactical surprise attack.

Senator WARNER. I think the Soviets have a better idea than the Americans as to how we would handle the question of command and control under these circumstances. I guess they know somebody will survive who will have the authority to execute the forces.

Mr. Secretary, last year we understood that the relocation of the NCA's NEACP aircraft from Andrews was immiment. The NEACP aircraft is still there, and as I understand it, plans to relocate it have, for all intents and purposes, been shelved; is that correct?

Mr. LATHAM. I am not sure whether we will be successful in convincing the White House to move it or not. We made that recommendation, as Admiral Nagler said, during the strategic connectivity review and a report was submitted to the White House.

We have discussed it with members of the National Security Council. Right now the plan is apparently still to leave it there. We would strongly recommend that it be moved, but they seem to be inclined to leave it there.

Senator WARNER. How many NEACP's are in operation?

General DAVIS. Three today. One is in modification to upgrade it from an E-4A to an E-4B. By 1985 we will have all four modified as E-4B's. During the interim we will have [deleted].

Senator WARNER. Those are tough decisions to make.

On the EMP threat, General Dickinson, there appears to be continuing disagreement among senior military officials as to the magnitude of the threat from electromagnetic pulse and the need to take steps to harden key systems against this threat and the disability of doing so.

Do you have any further comment on that?

General DICKINSON. I don't find any major disagreement, certainly not among the knowledgeable community, about the existence or the magnitude of the threat. There is discussion among the engineering community, about the details of [deleted]. That is a difficult engineering question.

There is ground for considerable discussion as to what you do [deleted].

There is very little disagreement on our capability [deleted].

What is done after that is being addressed by [deleted]. There are high-level discussions going on at the present time.

Senator WARNER. Secretary Latham, recently the subcommittee went into the space program. One of the subjects that stood out is the need to make space assets and their critical in-ground stations, both operational users and control stations, more survivable.

What is being done to make these systems less vulnerable to attack? Could more be done in the area of mobile ground terminals to enhance ground nodes' survivablity?

Mr. LATHAM. We have several programs underway to do that.

First of all, as I mentioned in the opening statement, for the defense satellite program, the [deleted] we are in the process of procuring six mobile ground terminals which have the capability to accept the information from the satellite, process it and then relay data through a supporting communications network to various users.

We have taken steps on that very particular important space asset.

In the broad area of space systems' survivability, there is an effort underway now that Mr. Carlucci has directed, and the results are due this May to Mr. Carlucci, as to what can be done to survive the national reconnaissance program assets in the area of MilStar and the DSCS III and the other communications satellite systems. That is why we are moving to a MilStar configuration from these prior systems, such that, for example, the satellite does not need to be tied to a major ground tracking station for command, control and telemetry; it can be handled autonomously through many terminals. The satellite can operate for weeks away from ground.

The same is being done with the IOND system. We are going to have a capability to actually command and control that from mobile facility. That is under design now by IBM.

So, we are taking each of the space segments and looking at them both individually as a program and then collectively as a system. It is a very, very difficult job on some of the [deleted] that they currently use.

We have a several million dollar study under way this year to see how we can do that in either a mobile or some sort of reconstituted processing facility either on the ground, deep underground or in some covert-type capability. It is not an easy job, but it is being comprehensively addressed.

Senator WARNER. Mr. Secretary, I asked the Secretary of the Air Force, Mr. Orr, if the MILSTAR program was adequately funded for its projected IOC. He assured me that it was. I have information that is somewhat contrary, that maybe we are $50 million short.

Mr. LATHAM. That is the one I referred to in the open hearing, when you asked are we adequately funded. Our judgment is that we need some additional moneys in fiscal 1983 for the MILSTAR program in order to hold the [deleted] IOC.

The original IOC was [deleted] I said that we are unacceptable. We said it must be accelerated.

The Air Force says they could do that if the funding profile to do it was increased.

When we put the budget together—and this was done as part of the connectivity review—we tried to submit the reports to the President on August 13. At that time the budget was still being discussed in some considerable detail, and we haven't been able to plus up the C^3 part of the strategic budget substantially.

That is where that $18 billion came from. We put that whole package together. It was approved and we sent over the package with the missile and so we did not tamper with it after that. Subsequent to August the studies that the space division had underway by several contractor teams were available. We examined their cost figures and the profile, to be able to make the launch and, frankly, we came up slightly short in 1983. That is where the numbers come from. We were not smart enough in August to address that. We are adequately funded in 1982.

We have approximately $90 million and we need $135 million, so we are about $50 million short.

Senator WARNER. If you can document that, we will address that during the course of our markup.

Mr. LATHAM. Thank you.

Senator WARNER. On MILSTAR, are the other panelists satisfied with the present configuration of this system and the IOC?

General DICKINSON. We are extremely happy to have that IOC advanced as much as possible and the best technical advice is that is really the earliest feasible time.

We are quite happy with the design of the satellite and the division of responsibilities on that satellite.

General DAVIS. We are very pleased both in the Connectivity Staff and in the Strategic Air Command. I think we have to look at it very carefully. I believe the figure is closer to a $59 million shortfall.

I think what we are looking at to advance the IOC is probably another [deleted] million. I think we have to balance off an early IOC with technical risk. I am all for the system. I would like it as soon as possible. But, as we all know, with a finite resource package we have to make a conscious decision on that recommendation.

It gets what we want. It will provide us not only force management connectivity but also enduring connectivity.

Senator **Warner**. General Hartinger?

General **Hartinger**. There is no question we need MILSTAR and we need it as soon as possible.

Admiral **Nagler**. I agree, we need MILSTAR and we need it as soon as possible. I agree with General Davis that [deleted] is an optimistic date. We must insure that the funding, the people and the supplies keep right on track. If there is any slip in any of that, I don't see how the [deleted] date can be achieved.

Senator **Warner**. While you are testifying, why don't you put that information on TACAMO that you want in the record.

Admiral **Nagler**. Our basic problem with TACAMO [deleted].

To date, the TACAMO aircraft, as I mentioned in open testimony, are overweight; they are stressed; they are aging.

Within the next 4 to 5 years, [deleted].

If we put that money in improved aircraft, our studies have shown that [deleted] EC-13's would do.

So, yesterday we went out with a request for quotation on a new aircraft to replace the TACAMO aircraft. It is a competitive bid. We will certainly want to get along with that. We firmly believe that TACAMO is our [deleted].

ELF and MILSTAR are greatly needed, but TACAMO is our No. 1 priority.

Senator **Warner**. Do we have the correct information that you are concentrating more on the airframe and engine rather than on the internal C^3 suite?

Admiral **Nagler**. You do have the correct information, Mr. Chairman. We think right now the [deleted]. The subject is affordability. On the aircraft we know it is inadequate, so we must get on right now to replace the airframe and we intend to transfer the current avionics to the new airplane.

You are correct, we [deleted] so we are taking them in steps. It is strictly an affordability problem

Senator **Warner**. Turning now to air defense, General Hartinger, I understand that your command recently provided to the Defense Department a study of the air defense needs of the United States. Can you summarize for the committee your major conclusions?

General **Hartinger**. Yes, sir.

First, I would like to say, Mr. Chairman, that this is probably the best year NORAD has had, that the air defense mission area has had, because it is the first time we have been supported strongly in over 20 years. Last week Secretary Weinberger voiced his concern over improving our continental air defense. Also he signed our air defense master plan this week.

My top priority requirement in that plan is an atmospheric or bomber early warning system around the continent to complement our missile warning capability in providing a balanced deterrent posture by eliminating a no-warning bomber option that is available today and could be attractive to Soviet planners. We have tested an over-the-horizon radar that bounces its radio energy off the ionosphere and thus can see bombers out to about 2,000 miles rather than 200 miles we see them now.

Across the north, over-the-horizon radar is degraded because of the aurora interferency which disrupts the ionosphere, therefore, it looks like we will be updating our Distant Early Warning Line to provide an all altitude bomber warning capability there.

[Deleted]. Six of the interceptor squadrons are programed to receive F-15's plus the Canadians are replacing their three CF-101 squardons with CF-18's.

The requirements we stated have been approved by the Secretary of Defense. We are very pleased with it, sir.

Senator WARNER. If we were to give you some questions, Admiral, on the funding on that TACAMO program, could you within the time you have modify that RFP or do something to the C^3 system?

Senator WARNER. Why don't you think that one over. You had better go back and talk that one over.

Admiral NAGLER. I will submit an answer for the record.

[The information follows:]

TACAMO COMMUNICATIONS SUITE UPGRADE

Admiral NAGLER. This responds to your question concerning options to upgrade the communications suite in our TACAMO/ECX program. Development and procurement of this follow-on modern aircraft for the TACAMO mission is the Navy's highest priority strategic communications improvement. Our plan is to acquire an airframe which can fully perform the challenging TACAMO mission of the late 1980s and beyond and equip it with the proven communications suite transferred from the EC-130 aircraft. This is the most cost effective option to rapidly attain the capability required. A complete redesign of the communications suite was originally considered and deleted from the plan [deleted] considerations. We would plan to upgrade the communications suite in the ECX airframe in an evolutionary manner [deleted] system requirements. Any hardware in this evolving suite, upgraded and improved in stages, can be referred to as a Track I program.

It would provide for [deleted] and so forth. It would be accomplished and intergrated into the ECX program [deleted]. The need to insure that the communications suite is modernized and fully capable to perform in a sophisticated electronic environment of the future is recognized.

[Deleted]. The Naval Material Command would be tasked to designate a lead laboratory, the Naval Air Development Center (NADC), to develop a total system specification which would provide for the integration of MEECN changes into the suite as it was designed. This approach, designated Track II, [deleted] can be attained and efficiently integrated into the ECX aircraft as a replacement for the Track I system after full operational capability is attained. Competition among contractors to produce this suite, if required, could occur in Fiscal Year 1984 when hardware and software specifications would be completed. This would be followed by a prototype system, laboratory tests and production contracts. It is estimated that this plan would produce [deleted].

Senator WARNER. We will put in the record the prepared statements of Admiral Nagler, General Hartinger and Brig. Gen. William P. Bowden, Deputy Director, Logistics Plans and Programs, Office of the Deputy Chief of Staff for Logistics and Engineering, Headquarters, U.S. Air Force.

[The prepared statement of Admiral Nagler follows:]

PREPARED STATEMENT OF VICE ADM. GORDON R. NAGLER, U.S. NAVY, DIRECTOR, COMMAND AND CONTROL

Mr. Chairman, I am pleased to have this opportunity to discuss the Navy's Strategic Command, Control and Communications Program. In my remarks today, I will strive to provide you with a broad perspective of how our program relates to improving the survivability and endurance required to provide effective C^3 support for employment of Navy sea based strategic weapon systems.

The importance in attainment of this improvement is represented by the current high level attention and emphasis on strategic C^3 capabilities which includes corporation of this objective as a major initiative in the President's strategic modernization program and the support provided by Congress in the fiscal year 1982 budget. The objectives, program initiatives and priorities for its attainment are evolving from a comprehensive service, OSD and agency review process under the personal direction of Dr. Jim Wade, Principal Deputy, USDRE, in the Office of the Secretary of Defense.

The first phase of this effort, completed in August 1981, focused on the establishment of a balanced C^3 program start in fiscal 1983. The decisions made by the Wade committee, on which it was my privilege to serve as the principal Navy member, are fully supported by the Navy both in policy and specific C^3 program initiatives it recommends.

CURRENT ASSESSMENT

There is no question in my mind that the U.S. Navy has the finest peacetime and crises management command and control system in the world today. We have the capability to reach and exchange time critical command instructions with Navy and Marine forces worldwide almost instantaneously.

Our current systems are [deleted]. The primary direction then of the program we have structured emphasizes attainment of increased survivability and endurance in an affordable manner.

NEW REQUIREMENTS

Recent changes in [deleted].

Our present communication system [deleted] and necessitated an emphasis on the development of [deleted].

FISCAL YEAR 1983 PROGRAM

The Navy's 1983 budget is highly supportive of this goal. Major initiatives of importance in our program include: Continued operation and improved capabilities for the current Tacamo airborne VLF relay system; initiation of development to attain a more capable replacement airframe (ECX) to adequately perform the Tacamo mission of the future; participation in the joint development of an extremely high frequency (EHF) military strategic tactical and relay (MILSTAR) satellite communication system with low probability of intercept [deleted] full support for the extremely low frequency communications plan approved by the President and Congress; research and development of reconstitutable communication concepts; and initiatives to provide more effective and survivable C^3 to battle group commanders at sea to permit [deleted]. I shall highlights the key aspects and status for each of these initiatives.

TACAMO

The Tacamo airborne VLF relay system is the cornerstone of our survivable C^3 nuclear control order delivery capability to our Poseidon and Trident submarine fleet. Under attack, our current fixed broadcast system may last only several minutes, [deleted]. The current Tacamo EC-130 force level of [deleted] aircraft provides the capability for maintaining a 100 percent continuously airborne status in the Atlantic and about [deleted] in the Pacific. The program is building [deleted] which will be attained in [deleted].

The fiscal year 1983 submission includes funding to support the operation of the current system and add electromagnetic pulse hardening to [deleted] which will increase the total number of Tacamo aircraft provided with this protection to [deleted] these aircraft will be [deleted] and the current force level of [deleted] aircraft should be expanded [deleted] by the late 1980s [deleted].

ECX

[Deleted.] A cost benefit analysis of corrective actions indicates that the optimum alternative is the transfer of the Tacamo communications capability to a modern, more capable airframe and that in this configuration, the Tacamo mission can be performed by a fleet of 15 aircraft. The report, which documents this analysis and examines alternatives to this action in response to tasking from the fiscal year 1982 hearings, was forwarded by Secretary of Defense Weinberger to the committee chairmen on 25 January 1982. The request for proposal for competitive procurement for ECX will be issued to industry this month. The fiscal year 1983 budget supports this development as the top priority navy strategic C^3 initiative.

EHF SATCOM

The new military strategic, tactical and relay satellite (MILSTAR) system, a DOD joint program under USAF leadership, will provide extremely high frequency (EHF) satellite communications for all DOD strategic and tactical users. This system is the outgrowth of DOD initiatives to develop and implement a highly jam resistant, low probability of intercept satellite communications system possessing strong survivability attributes.

It is based on previous advanced development work which demonstrated that EHF frequencies offered characteristics that make this choice of frequencies highly desirable for military use. For example, the [deleted).

MILSTAR

The above cited advantages [deleted] based on this, a military satellite communications system architecture was developed to ensure a coordinated approach in fielding a satellite communication system. A key element in this new architecture is the MILSTAR spacecraft, EHF terminals and associated equipments. A streamlined management system has been established, and actions are now underway to staff the program office. The MILSTAR management organization is comprised of a joint MILSTAR program office located at U.S. Air Force Space Division and principal component offices for system engineering; spacecraft development and acquisition, also in Los Angeles; and the Joint Terminal Program Office, located in Washington, D.C., under Navy leadership.

As defined, the system consists of [deleted] Army and Air Force research work on terminal development is at an advanced stage and the Navy effort has progressed into a full-scale development status. Contracts have been awarded for production of 12 engineering developmental model terminals for Navy applications. Two submarines, three surface ship and one shore terminal will be produced by each of two contractors and competitively evaluated in technical and operational testing in 1985. This program will establish the basis to award a follow-on production contract. To complete this evaluation, an [deleted] package is under development at Lincoln labs for integration and flight on FLTSATCOM satellites No. 7 and possibly No 8. This package, funded by the Navy is under acquisition authority of the joint MILSTAR program office to insure its development is supportive of the MILSTAR space segment.

ELF

The small extremely low frequency communications system approved by the president is important to the strategic program. This system will add a new dimension of capability and expand the operational envelope of command and control connectivity to our submarines. Its inland location, inherent resistance to jamming and electromagnetic pulse protection will enable it to reliably function [deleted] than any of our other fixed systems under attack and deliver important alerting messages. This "heads up" will enable our submarines to adjust their operational posture to receive [deleted] under peacetime or limited conflict scenarios, the "paging" capability from ELF is tactically useful. It will enable us to maximize deep depth operations for special missions of importance such as arctic or surveillance operations.

[Deleted.]

Earlier in my testimony, I stated that attainment of strategic C^3 improvement must be affordable. This was a concern with previous ELF initiatives. The current system is responsive to this goal. Reduction in its basic size, simplification in receiver design, and use of above ground construction resulted in over a $200 million reduction on estimated system cost as compared with the previous initiative.

In a similar context, the development of a blue-green laser system [deleted].

While some public opposition to the ELF project exists, I am optimistic about final public acceptance of the project. Coordination and cooperation with State officials and agencies has been excellent in recent months. An internal advisory committee has been established, with State representatives as monitors in the development of the environmental research and protection plan for the system. Proposals for over $750,000 of environmental research have been issued for public bid. It is expected that most of this work will be done by firms and educational institutions in the Wisconsin and Michigan areas. This close coordination with local agencies and hands-on participation by local firms and universities in the environmental research and protection process will enhance its credibility.

Operationally, the Wisconsin test facility is currently transmitting [deleted]. reliable reception within the [deleted] developmental efforts through the end of fiscal year 1983 will concentrate on: transmitter and receiver component design and site construction planning. Site and biological survey work is expected to commence in the Michigan State forest area as soon as the weather permits. Specific antenna and transmitter location options will be available in the fall of 1982 with construction scheduled to start the following summer.

The initial operational capability with [deleted].

SURVIVABLE AND ENDURING C^3

Over 2,000 technical possibilities have been examined for their application to fill or reestablish anticipated breaks which will occur in strategic connectivity in an extended conflict due to attack on fixed facilities and the limited endurance of airborne platforms. Several of these have been identified for additional conceptual study and develoment as ways to reconstitute connectivity to surviving navy strategic weapon systems during conflict. These include: [deleted]. This work is being pursued to establish a network based on link and frequency redundancy and mobility to be activated by procedure to bridge gaps which will occur and assure connectivity is maintained. We foresee no significant technical problem in accomplishing this and expect to have a more definitive system concept completed within the next year.

FLEXIBLE FORCE MANAGEMENT

The current emphasis on more flexible employment of nuclear weapons establishes a new and more demanding strategic C^3 requirement for all naval forces. [Deleted.] To accomplish this, the existing strategic command and control structure required must be upgraded to a uniform configuration and expanded to connect to all nuclear capable units. It must provide for:

The capability to [deleted].

To assure that [deleted].

Provide for [deleted]. This capability shall be such as not to significantly endanger or degrade the survivability of the reporting force.

Provide the capacity to [deleted] terminate the conflict on favorable terms.

Possess characteristics which are highly resistant to threats of known importance, I.E., EMP and jamming.

NAVY C^3 PLAN

Attainment of the capability is a significant challenge. Several initiatives have been taken within the last year to analyze, assess, and initiate a plan for its accomplishment. These include: the development of a comprehensive Navy C^3 plan which spans the range of Navy missions [deleted] and a separate dedicated assessment [deleted]. These documents establish the base to build from the developmental initiatives now underway toward attainment of a truly surviving and enduring wartime strategic C^3 system. With your continued support, I am confident this can be attained.

SUMMARY

In summary, current C^3 connectivity to Navy strategic forces is being met adequately in the pre-attack or deterrent phase of conflict with the fixed shore broadcast system and survivable connectivity in the trans-attack phase will be provided by the Navy Tacamo system. Initiatives in this budget which: Upgrade the capabilities of the current Tacamo fleet; initiate the development of a more capable follow-on airframe ECX; improve connectivity to Tacamo and other strategic forces through EHF SATCOM, and enhance communications effectiveness will improve the survivability and endurance of the Navy strategic C^3 capability in an extended period nuclear conflict.

Mr. Chairman, I would now be pleased to answer questions on this program.

[The prepared statement of General Hartinger follows:]

PREPARED STATEMENT BY GEN. JAMES V. HARTINGER, COMMANDER IN CHIEF, NORTH AMERICAN AEROSPACE DEFENSE COMMAND AND AEROSPACE DEFENSE COMMAND

INTRODUCTION

Mr. Chairman and Members of the Committee: It is a pleasure for me to appear before you again and to provide an update to my testimony of a year ago.

The year 1981 was a successful one for NORAD because of the growing recognition of our critical role in this country's deterrent posture. The President's strategic modernization program specifically outlines improvements in an effort to regain the strategic initiative from the Soviets. This is the first strong support for strategic defense we have had for over two decades. We have funded programs in all three of our mission areas: Missile Warning, Space Defense, and Air Defense. So NORAD has turned the corner toward recognized credibility. This turn is evident in physical improvements, and especially in the morale and enthusiasm of the men and women who do the job. Your support has certainly helped in our progress, and we appreciate that very much.

Today I will emphasize the importance of maintaining the momentum generated to this point.

MISSILE WARNING

The most important programs are improvements to our missile warning systems. This priority stems from the magnitude of the threat we face and the potential for little or no strategic warning. By any measurement, that threat has taken on a new and more serious meaning over the last 20 years.

As I indicated last year, the [deleted] satellites, using infrared sensors, [deleted] detect a missile [deleted].

[Deleted.] In the past twelve months, we have taken several actions to improve the quality and survivability of the [deleted] system. These improvements, which will be on the next family of satellites to be launched, will include higher resolution sensor elements and associated ground station equipment—improvements which will refine missile azimuth and launch point information. The [deleted] Simplified Processing Station will achieve operational status next month. This transportable ground station provides a backup in case other ground terminals should fail, and gives us the flexibility to put a terminal overseas. For the future, we are developing a [deleted] capability [deleted] and we are moving toward deployment of Mobile Ground Terminals. By continously changing locations, these mobile terminals will be far more survivable than the existing fixed terminals. These improvements will enable [deleted] to serve as the "bell ringer" for several years to come.

[Deleted] one of our radars picks up the missile, tracks it, comfirms an attack is underway, [deleted]. Using the two technologies, infrared and radar, provides what we call "dual phenomenology" [deleted].

Our radar system to confirm ICBM launches is BMEWS, which has been operating over twenty years from sites in Alaska, Greenland, and England. While it is still one of our most reliable systems, upgrades are underway and more are needed.

BMEWS radars were designed to just detect a raid and say the "missiles are coming" to support the national policy of massive retaliation in the 1960s. And, the radars could do that by tracking [deleted]. Now they must not only report that the "missiles are coming" but must also tell the NCA where they are going. To do that, the sensors must be able to see [deleted].

The BMEWS Modernization program includes an improvement to the Missile Impact Predictors which will replace pre-1960 vintage computers with modern high-speed systems. Further, an enhancement of the BMEWS tracking radars will allow discrimination of smaller targets, so that we can more accurately count incoming warheads and have increased tracking capacity.

Our radars to confirm SLBM launches are the two PAVE PAWS phased array radars which became operational in 1980 at Beale AFB CA and Otis AFB MA. They can see out to [deleted].

Last year, you included funds for Southeast and Southwest PAVE PAWS in the President's fiscal year 1982 budget mark up to eliminate these coverage limitations. The Congressional conference decided to delete the site procurement funding from the 1982 Amendment, but it is back in the fiscal year 1983 budget. We hope that it stays there so we can move toward construction.

My concern, in light of the renewed emphasis on strategic modernization, is that we could send the wrong signal to our allies and potential enemies by failing to support PAVE PAWS. More importantly, we would leave [deleted] deficiencies in our missile warning system.

We also have [deleted].

But again, we have proposed a fix with a power upgrade to PAVE PAWS that will increase their tracking capacity and better their discrimination so they can see MIRVs and provide essential warning information—that is, the size of the raid and predicted impact areas.

The President's 1983 Budget includes funding for PAVE PAWS southeast and southwest and partial funding for BMEWS. At that funding level, the improvements will greatly increase our ability to provide unambiguous, accurate and reliable warning. We must hold the line.

ATMOSPHERIC WARNING

Not mentioned last year, but also important for strategic defense, is a bomber and cruise missile early warning system to complement our missile warning capability so we have a balanced deterrent posture [deleted].

The air defense drawdown over the last 20 years has left us [deleted].

To get the early warning we need off our coasts, we have successfully tested an Over-the-Horizon Backscatter (OTHB) radar that can see bombers [deleted].

We plan to deploy an OTHB on each coast by the [deleted].

Polar coverage is [deleted]. Therefore, we are going for a modernized DEW Line, consisting of minimally attended and gap filler radars which can provide an all-altitude bomber detection capability. These programs are contained in the President's 1983 Budget.

With this early warning system—the important point again is—we can [deleted] and we can also employ our limited number of AWACS and interceptors in a more efficient manner.

IMPACT OF IMPROVEMENTS

How important are these missile and atmospheric warning system improvements to me as CINCNORAD? They mean that I will be able to carry out my responsibilities properly for the first time. That responsibility is to survive our retaliatory and defensive forces, and to support the time sensitive NCA decision making process. It is the very heart of our deterrent posture.

We are intimately involved on each space and missile launch, because I must assess whether or not it is a threat to North America. That happened about [deleted]. After checking with all the centers in Cheyenne Mountain I make my assessment in [deleted] minutes. The reason CINCNORAD makes the assessment is because it is in his charter and because he has more information than anyone else in the strategic community. Also, it is like the two-minute drill in football, there is not time for committee action.

In the future, to survive our missile and atmospheric warning systems will need new space-based sensor technologies with on-board data processing and [deleted] communications to mobile or otherwise survivable ground terminals. The ground-based sensors we have today, even though their [deleted] meet our future needs.

In order to deter attacks on the United States, as General Davis testified, our forces must not only be ready to perform, but today must survive to perform, and we must have an enduring C^3 system to achieve that war fighting capability. For that reason. I strongly support the development of the systems identified by Mr. Latham and General Davis—Jam-Resistant Secure Communications, the Ground Wave Emergency Network, MILSTAR, and efforts to EMP-harden critical facilities.

In addition to supporting improvements to the overall C^3 system, we are taking initiatives to improve NORAD's ability to survive an initial attack. We are increasing the survivability of Cheyenne Mountain—especially against EMP. And, we are planning a Rapid Emergency Reconstitution Team with key personnel [deleted].

CONCLUSION

In closing, I want to tell you that "NORAD" is on the move. In my trips to the Pentagon and testimonies here this past year, I have received across-the-board support for what we are doing at NORAD. That has to be encouraging. I look forward to your continued support in making essential improvements to our strategic defense posture.

Thank you.

[The prepared statement of General Bowden follows:]

PREPARED STATEMENT OF BRIG. GEN. WILLIAM P. BOWDEN, DEPUTY DIRECTOR, LOGISTICS PLANS AND PROGRAMS, DEPUTY CHIEF OF STAFF/LOGISTICS AND ENGINEERING HEADQUARTERS, U.S. AIR FORCE

Mr. Chairman and Members of the Committee I appreciate the opportunity to present to you the Strategic Communications portion of the Other Procurement, Air Force (OPAF) Electronics and Telecommunications fiscal year 1983 budget request. The total Electronics and Telecommunications budget program for fiscal year 1983 is $1.4 billion of which $444 million is being requested for Strategic Communications. This is the first year the Other Procurement Appropriation is being reviewed by both Armed Services and Appropriation Committees.

The Air Force fiscal year 1983 Strategic Communications Procurement Program will provide many sorely needed improvements; significantly modernize strategic communications, command, and control (C^3) systems; and enhance the Air Force's capability to provide rapid, accurate and reliable strategic information to national command authorities and military commanders. The fiscal year 1983 strategic C^3 procurement program contains four main categories: Strategic Defense, Strategic Command and Control, Space Programs, and Strategic Training and Logistics Support. Several programs included in the Strategic C^3 program also provide communications for tactical forces. These programs will be highlighted in the discussion of the procurement programs that follow. Funds requested are for ground communications-electronic equipment only.

STRATEGIC DEFENSE

The major portion of strategic C^3 procurement funds are requested for strategic defense which consists of missile surveillance and warning, atmospheric surveillance (air breathing platforms) and warning, and space surveillance and defense. Deficiencies associated with age and limitations of coverage make existing early warning and surveillance networks vulnerable to Soviet exploitation. Therefore, the Air Force has undertaken several research and development programs to correct known deficiencies and provide additional capabilities to meet projected strategic threats. Many of these programs have progressed to the production stage and will require fiscal year 1983 procurement funds. A comprehensive discussion of some of the strategic defense procurement programs follows:

DEFENSE SUPPORT PROGRAM (DSP)

An operational DSP is a key element of our nation's strategic defense posture. DSP satellites provide data to dedicated ground stations which transmit appropriate messages to the National Command Authorities (NCA), North American Aerospace Defense Command (NORAD) and Strategic Air Command (SAC) in near-real time. To improve the survivability of the operational data, the Air Force has developed a truck-mounted Mobile Ground Terminal (MGT). Fiscal year 1983 funds will procure the 4th, 5th, and 6th MGTs and Jam Resistant Secure Communications (JRSC) vans to accompany each MGT. Also included in this year's request are funds to continue the DSP ground station improvement program. The program will ensure continued ground station compatibility with evolutionary DSP sensor improvements.

PAVE PAWS

The PAVE PAWS dual faced, phased array radar system provides early warning of Submarine Launched Ballistic Missile (SLBM) launches against the United States over a 3,000 nautical mile range and monitors satellites in low earth orbits. Currently PAVE PAWS sites are located on the east and west coasts. Fiscal year 1983 funds will procure a southeast site, and fiscal year 1984 funds are currently programmed to procure a southwest PAVE PAWS site.

SEEK IGLOO

The SEEK IGLOO program will provide a total of 13 minimally attended surveillance radars with integral height finding capability and support subsystems to replace existing surveillance and separate height finder radars operated by the Alaska

Air Command. Fiscal year 1983 funds are required to procure the remaining four SEEK IGLOO minimally attended radars.

DEW LINE REPLACEMENT

The Distant Early Warning (DEW) Line was designed in the 1950s to provide long range early warning of medium and high altitude bomber attacks. It has gaps in coverage at low altitudes and is becoming more difficult and expensive to maintain because of its age. The Dew Line Improvement Program will replace the existing 31 radars with minimally attended and gap filler radars. Funds to procure four minimally attended radars in fiscal year 1983 are requested.

PLAN POSITION RADAR SCOPE INDICATOR REPLACEMENT PROGRAM

The Air Force began a program in fiscal year 1982 to replace AN/UPA-35 and AN/UPA-48 radar scopes that are of the 1940-1950 vintage. The existing scopes are deteriorating and becoming costly to maintain. The fiscal year 1983 program replaces old equipment with solid-state assets which can display radar, beacon, mapping, and other video symbology.

SPACETRACK

The Air Force's strategic defense activities in space are oriented toward space surveillance, the survivability of United States satellite systems, and a capability to intercept enemy satellites. The satellite tracking mission is conducted by the North American Aerospace Defense Command, using a suite of satellite tracking radars, deep space tracking cameras, interferometers, and missile warning or intelligence collection radars in a collateral use mode. The Air Force component, the SPACETRACK system, is being augmented by acquisition of the Ground Based Electro-Optical Deep Space Surveillance System (GEODSS) and modifications to reduce radar tracking errors by use of Navy Navigation Satellite System.

STRATEGIC COMMAND AND CONTROL

Command and control systems provide early warning, assessment and force status information to and from military commanders and the NCA. The NORAD Cheyenne Mountain Complex, SAC Command Center, National Military Command Center, Alternate National Military Command Center, and Airborne Command Posts are the vital strategic command and control elements. Measures to improve the reliability, survivability, and endurability of these vital Air Force strategic C^3 systems are underway. A discussion of fiscal year 1983 procurement programs follows:

NORAD CHEYENNE MOUNTAIN COMPLEX

The NORAD Command Post (NCP) provides the Commander-in-Chief of NORAD the facilities and communications necessary to exercise command and control over his assigned forces and to provide essential decision making information to the NCA. Of particular concern in fiscal year 1983 is the Space Defense Operations Center (SPADOC). In a phased upgrade of the SPADOC operational capabilities, requested funds will procure hardware required to support capabilities to warn of attacks on US datellites, to recommend defensive countermeasures, and, if deployed, to exercise operational command over the US antisatellite system. The SPADOC hardware is required to handle sensitive, compartmented information and collateral data bases as part of the status monitoring and warning process. Fiscal 1983 funds also procure a replacement computer for the SPADOC Computational Center to replace the current system which is inadequate to perform the computation-intensive tasks of satellite attack warning quickly enough to make a difference to the target satellite. New mission responsibilities to support space shuttle, LASER irradiance avoidance, deep space catalogue maintenance, and (if deployed) US antisatellite operations, will far exceed the capabilities of the current World Wide Military Command and Control standard computers.

WORLDWIDE MILITARY COMMAND AND CONTROL SYSTEM (WWMCCS)

The WWMCCS system provides the means for operational direction and technical administrative support to command and control of US military forces. WWMCCS supportrs the NCA, Joint Chiefs of Staff, Commanders of the Unified and Specified Commands, and the military services and agencies through all levels of crisis and conflict. Fiscal year 1983 procurement funds will provide replacement of several obsolete, dificult to support automatic data processing equipment (ADPE) components. The 1983 request also contains 28 other separate projects. One such project is an upgrade to the Single War Planning System ADPE at SAC headquarters.

AIR FORCE SATELLITE COMMUNICATIONS SYSTEM (AFSATCOM)

The AFSATCOM system satisfies an urgent DOD requirement for reliable communications to ensure command and control of the Single Integrated Operational Plan (SIOP) forces and other nuclear capable forces. Fiscal year 1983 funds will procure five advanced AFSATCOM network monitoring and control terminals and modifications to 85 radios to upgrade AFSATCOM UHF terminals to operate in a more jam resistant mode.

DEFENSE SATELLITE COMMUNICATIONS SYSTEM (DSCS)

The DSCS system provides super high frequency (SHF) satellite communications for secure voice and high data rate transmissions for multiple users and supports WWMCCS, crisis management, intelligence, strategic defense, Presidential, and diplomatic communications requirements. Fiscal year 1983 funds will provide interconnect facilities to interface DSCS terminals to the jam resistant communications network and will provide solid state uninterruptable power systems to six DSCS locations.

FIXED PLANT TELETYPEWRITER REPLACEMENT PROGRAM

Fiscal year 1983 procurement funds will continue the replacement of 1940–50 vintage teletypewriter's especially at Strategic Air Command bases.

SPACE PROGRAMS

The third portion of the Strategic Communications Procurement Program consists of those ground communications facilities required to support space and missile test ranges, satellite control, space systems operations, and the space shuttle. Space communications security (COMSEC) equipment supporting these systems is also included. A discussion of these programs follows:

SPACE AND MISSILE TEST ORGANIZATION RANGES

The eastern and western test ranges provide support for the operation of launch and down-range facilities required for a wide variety of missile and space-vehicle tests. Facilities provide telemetry, tracking, optics, timing, and associated data handling computational and communications systems. Fiscal year 1983 funds will continue an improvement and modernization program for each range. Equipment replacements, correction of deficiencies, new capabilities, and communications upgrades will enable the ranges to support new programs such as space shuttle and other DOD, NASA, and other agency test programs.

SATELLITE CONTROL FACILITY (SCF)

The Satellite Control Facility (SCF) is a national range tasked to support the research, development, test, evaluation, and operation of satellite systems. The SCF mission supports test operations with real time telemetry, tracking, command and control, and vehicle payload recovery. Fiscal year 1983 funds: conventional encoders to ensure compatibility with DSP satellites and mobile ground terminals; White Sands Tracking and Data Relay Satellite System interfaces to support the Space Shuttle program; five tracking and control site transmitter exciters; and the Oakhanger's wideband satellite terminal.

CONSOLIDATED SPACE OPERATIONS CENTER (CSOC)

CSOC will support an increasing satellite control workload, provide a backup in the critical elements of the network to operate these space systems, and enable planning and control systems that fully exploit the Space Shuttle. The fiscal year 1983 funds will procure equipment to be installed in the Shuttle Operations and Planning Complex, Satellite Operations Complex, communications equipment to tie CSOC to ground support facilities such as launch sites and remote tracking sites, and internal communications within the CSOC facility.

SPACE SHUTTLE OR SPACE TRANSPORTATION SYSTEMS

The Space Shuttle is a key element of our national capability in space. The Shuttle will enable us to put larger volume and heavier payloads to be put into orbit and to examine and repair orbiting satellites. Fiscal year 1983 funds will continue the procurement of communications equipment and navigational aids for the Vandenberg AFB Ground Support System.

SPACE SYSTEMS COMMUNICATIONS SECURITY (COMSEC)

The Air Force is the single manager for COMSEC equipment used in space systems. This includes most of the ground systems used to support space programs. COMSEC equipment protects command telemetry and mission information links of DOD space programs. Fiscal year 1983 funds will procure COMSEC devices to support the Satellite Control Facility, Space Shuttle, DSCS and special projects.

STRATEGIC TRAINING AND LOGISTICS SUPPORT

This category contains strategic C^3 spare and repair parts, and combat crew training equipment. A discussion of these programs follows:

SPARE AND REPAIR PARTS (STRATEGIC C^3)

Spare and repair parts are required to support the acquisition and subsequent deployment of new equipment, modifications and peculiar support equipment. These components satisfy initial employment of C^3 systems.

RADAR BOMB SCORING SYSTEM (SEEK SCORE)

The Seek Score system consists of a long range precision tracking radar, and ancillary equipment to track bomber aircraft to a predetermined weapon release point, and electronically compute the impact point accuracy upon a simulated weapon release. The system will be used for training aircrews and determining operational readiness. This will replace 1950 vintage equipment that has become very difficult to support. Fiscal year 1983 funds will be used to exercise a firm fixed price production option for nine systems.

Mr. Chairman, that completes my prepared statement.

Senator **WARNER**. That concludes the matters that the Chairman and the staff wish to cover for the moment.

We will have some questions for the record.

Again, I want to thank you gentleman for traveling from afar. I hope each of you will have a safe return to your respective homes and families. Have a pleasant weekend.

Mr. **LATHAM**. Thank you, sir.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

NORAD WARNING CAPABILITIES

Senator **WARNER**. Would you outline for the Committee your candid views as to whether or not NORAD's warning capabilities constitute an effective and reliable peacetime system?

General **HARTINGER**. NORAD's missile warning system is effective and reliable. Our network of worldwide and spaceborne sensors, computers and—most importantly—people have demonstrated their capability and reliability for more than twenty years. Although the existing bomber warning system has limited coverage and numerous low altitude gaps, we have programs underway to provide an atmospheric early warning network which will complement our missile warning capability.

Further, we have developed a computer architecture plan which is a blueprint of the computer system we have today and a road map on how we intend to modernize the system, in a systematic and modular manner over the next ten years. Such a modernization plan is necessary to keep up with technology, because new generation computers are available about every three years. Our Tactical Warning/Attack Assessment (TW/AA) Architecture plan does the same thing for sensors. And, NORAD's role as Executive Manager for TW/AA gives us the oversight authority to insure that system modernization is coordinated and orderly.

Senator **Warner**. Are additional steps needed to improve its capabilities? If so, what needs to be done and are the necessary funds programmed in this year's and future budgets?

General **Hartinger**. Yes, additional steps to improve the system are planned and budgeted in this and successive years. They are being made so that we can take advantage of improved technology and keep up with advances in Soviet weapons development.

Some of the improvements we have made during the last year include upgrading our five largest on-line computers in Cheyenne Mountain. These computers handle about 95 percent of NORAD's processing requirements. We also completed rebuilding the six diesel engines in our power plant and have a funded program for a backup battery-based uninterruptable power system. Additionally, due to the recognized extreme importance and complexity of our computer product, NORAD was granted an exemption from buying future standard WWMMCS computers last year.

We are also enhancing our sensor network. To improve the SLBM warning capability, radar gaps will be closed by adding PAVE/PAWS sites in the southeast and southwest. These programs are contained in the fiscal year 1983 President's Budget. Upgrades to the BMEWS radars will permit them to provide [deleted]. Although portions of the BMEWS improvement programs are currently unfunded, analysis is underway to determine the exact cost of those upgrades. When the analysis is complete, we will know what funding levels are needed in those areas. [Deleted.]

Improvements to NORAD's bomber warning system will include the deployment of OTH-B radars and an improved DEW line. OTH-B will eliminate the inherent line-of-sight limitation of microwave radars and will provide an all-altitude bomber detection capability out to 1800 miles off the coasts and in the southern U.S. The improved DEW line will provide an essentially all-altitude detection capability across the north. To assist the early warning sensors and to provide a survivable command, control and survelliance system, additional E-3As will be deployed. These efforts will [deleted] balance the deterrent posture. All of these atmospheric warning improvement programs are adequately funded in the President's Budget.

In the face of growing Soviet capability, these warning system improvements will allow NORAD to continue carrying out its responsibilities [deleted].

STREAMLINING THE ADPE ACQUISITION PROCESS

Senator **Warner**. Specifically, what steps are being taken to streamline DoD's own computer acquisition process? The Committee regards the reordering of DoD's ADP acquisition system to make it more responsive and less time-consuming, to be a parellel and indispensible part of improving this system. Is further legislative action required to accomplish this? Can such streamlining all be accomplished through improved DoD management and regulations? Is such improved internal management reordering being implemented?

Answer. Thus far, DoD has accomplished the following: We agree that reordering our management approach to the acquisition of computers and related items is of high priority. The Under Secretary (Research and Engineering) has delegated his new responsibility in this area to a Special Assistant who will develop, in concert with the Services, specific recommendations for this reordering and simplification. The intention is to accomplish this planning concurrently with review and, if necessary, revision of the interim criteria issued by the Deputy Secretary of Defense February 1, 1982. We can report more fully to you shortly after this review is completed at the end of July.

At this time, we do not believe further specific legislation to be required. As you know, there are a host of regulations, both within the Department and in the oversight process, which have been emplaced in the last 15 years to cover this activity. We do not wish to over react and throw out the baby with the bath water. Where the existing management process is sound, we wish to draw from it. Where our internal procedures are at fault we will clean them up. We believe that, by and large, streamlining can now be accomplished through improvement of the DoD and Service management and regulations.

We will give priority to simplying and streamlining our own procedures and regulations, but that which evolved over the better part of two decades cannot be replaced instantly. We must maintain sound management oversight if we are to be responsive to our duty to conduct acquisitions fairly, openly, economically and efficiently. That is our intent.

Senator **Warner**. As you gentleman will recall, the hearing we held last year on this subject prompted an important initiative aimed at relieving the Department of Defense of the statutory requirement to comply with a Federal acquisition process which was held to be inefficient, cumbersome and at cross-purposes with the efficient modernization of U.S. military computer assets.

Would you comment at this time and at great length for the record on the progress that has been made to date in streamlining this acquisition process since the enactment of the fiscal year 1982 Defense Authorization bill, citing, where possible, ADP upgrades that have been conducted or are being processed now in a manner consistent with the Congress' mandate that such procurement be handled in a more expeditious manner?

Answer. Thus far, DoD has accomplished the following regarding the December 1, 1981 legislation:

On February 1, 1982, the Deputy Secretary of Defense designated Dr. Richard DeLauer, Under Secretary of Defense (Research and Engineering), as the Senior Defense Official for all matters in the context of your initiative, now included as Section 2315 of Title 10, United States Code. In that memorandum, Mr. Carlucci also issued interim DoD-wide criteria for acquiring ADPE and ADP services under 10 US.C. 2315.

These interim criteria went into some detail to describe the categories of exclusion from the Brooks Act, as we understand the language without either expanding or contracting the coverage we believe you intended. Mr. Carucci's direction further stated that the Under Secretary (Research and Engineering) should make the determination, in coordination with the Assistant Secretary (Comptroller), as to which process would be followed if the guidelines left any doubt as to whether Public Law 97-86 or Public Law 89-306 applied. To date, there has been no request for clarification.

Dr. DeLauer has directed in a 16 February 1982 memorandum that a small high-level working group be formed to review the guidelines and to revise them if necessary to assure that the process is indeed streamlined. He set the deadline for this action as July 31, 1982.

To date, over thirty system augmentations or upgrades with a combined life cycle cost exceeding $150 million are bring processed consistent with the Congress' mandate. These include intelligence and command and control systems as well as weapon systems support such as missle range instrumentation and software support subsystems. We will establish a simplified tracking system to measure our performance under the revised structure.

General **Hartinger.** I agree with the OSD position.

TACAMO/ECX

Senator **Warner.** Has consideration been given to a split-buy of replacement aircraft for the EC-130Q's in view of the fact that an upgraded C-130 derivative could perform adequately the Atlantic Ocean-Mission?

Admiral **Nagler.** The split-buy concept is not under consideration, since we have chosen to modernize the TACAMO force now, during the initial period of EC-130 block obsolescence; nine aircraft will reach the end of extended service life during [deleted] and the remainder of the force will commence attriting in the [deleted]. It is feasible to operate a mixed force, however, analysis of several factors indicates this is not an attractive alternative. First, I believe it should be pointed out that our [deleted] is not tied only to the Pacific case. We already have TRIDENT missiles deployed in the Atlantic, and [deleted]. We could operate our SSBN's much [deleted]. Distances to be covered are greater in the Pacific, but Atlantic coverage should be significantly improved as well, with the modern aircraft. Then to, a mixed force would be operated during transition to ECX, but Operations and Maintenance costs would not necessarily be reduced. Based on 1950's technology, the C-130 airframe is costly to maintain: well over 20 Maintenance Man Hours are required for each Flight Hour (MMH/FH) as a TACAMO force average. Estimates for supporting a modern, more capable aircraft are lower, and this would result in reduced personnel requirements/costs, and recurring parts expenditures for ECX. Since the TACAMO mission could be performed by fewer ECX than EC-130's (15 VS. 29), projected fleet operations and maintenance costs are lower for the all-ECX fleet.

Senator **Warner.** What are the operational and cost considerations which influenced such a decision?

Admiral **Nagler.** The primary operational considerations are: (1) Performance of the TACAMO mission of the [deleted]. This [deleted] Trident missiles are now deployed in the Atlantic Ocean area, [deleted]. This would allow us to achieve connectivity [deleted] in the event of war. [Deleted] utilizing the full range of SSBN profiles made available by the longrange missile. With the introduction of TRIDENT into the Pacific fleet, the [deleted]. (2) Survivability, which is the dominant contribution to SSBN connectivity, [deleted]. This requires an aircraft with sufficient speed and range [deleted] the combination of TACAMO mission requirements calls for an aircraft with considerably more range than we now have with the EC-130.

Cost factors are based on procurement of a fleet of modern ECX aircraft to be used in both ocean areas. In addition to operational considerations, a driving force behind this modernization program is the block obsolescence of existing EC-130's. Nine EC-130's will reach the end of extended service life [deleted]. These aircraft must be replaced with C-130 airframes or with ECX aircraft. In the [deleted] the other [deleted] EC-130's will start reaching the end of extended service life, and replacements for those aircraft must be programmed late in this decade, and C-130's may not be available then. In order to modernize the force as soon as possible with aircraft capable of performing the [deleted] and avoid further investment in C-130's, the optimum solution is the transfer of the TACAMO communications capability to ECX. This was the conclusion of a recent cost benefit analysis of TACAMO alternatives performed for the Secretary of Defense. The analysis was forwarded to the Chairmen ot the House and Senate Armed Services Committees by Secretary Weinberger on the 25th of January, 1982. The estimate is that it would require 29 of today's EC-130s [deleted] to meet this requirement, or a force of 15 modern turbofan ECX aircraft.

If a mixed force were to be procured and operated, the potential would exist for [deleted] while the EC-130 could [deleted]. Any commonality that existed between aircraft types in the beginning would gradually diminish as modifications were introduced into the ECX. Perpetuation of the mixed force would only postpone procurement of additional ECXs to replace [deleted] EC-130s until later, when they will be more expensive.

Senator WARNER. Would you describe for the Committee the central reasons behind the Navy's recommendation that the TACAMO mission be upgraded by the acquisition of a new aircraft capable of greater range and higher speed than the present EC-130Q's?

Admiral NAGLER. Reasons for the acquisition of ECX are based upon [deleted] and a desire to accomplish the TACAMO mission in the most cost-effective manner. The current (EC-130) TACAMO system, which is operated [deleted].

These include: (1) [deleted]. (2) A [deleted] effects, although hardening for the newest TACAMO EC-130's is funded, (3) [deleted] and (4) [deleted]. Analysis of alternatives to TACAMO, provided by SECDEF to the Chairmen of the House and Senate Armed Services Committees in January 1982, indicated that a fleet of modern, turbo-fan aircraft capable of maximum range cruise speeds almost twice that of the EC-130, could perform [deleted] in the most cost-effective manner. Such an aircraft could provide requisite [deleted]. The EC-130 could [deleted].

Senator WARNER. I understand that the Request For Quotations for this aircraft procurement has just been released to industry. Do the requirements and specifications established in this RFQ represent substantially different performance characteristics than that characteristic of the present TACAMO force?

Admiral NAGLER. The requirements set forth in the Request For Quotations (RFQ) are based on operational profiles which will typify the TACAMO [deleted]. These requirements are specifically the RFQ calls for an aircraft which can (1) [deleted]. The EC-130 has a maximum radius of action of [deleted] miles, but it cannot perform any on-station functions at that distance. The RFQ also calls for an aircraft that is [deleted]. These mission enhancements could be added to the EC-130, [deleted] and ECX would have this potential.

The reason we are conducting the ECX competition is to [deleted] while preparing for the [deleted] and requirements must necessarily be based upon the mission, not any individual airframe. The winning airframe will be selected based upon a combination of technical, cost and supportability evaluations. To minimize cost and schedule risk, the Navy hopes to buy an existing/in-production aircraft. Bidders are not restricted from proposing aircraft which may include derivatives of existing aircraft or modification to available active or retired fleet aircraft. A number of aircraft are considered capable of scoring well in this competition.

Senator WARNER. Specifically, what military requirement prompted these changed specifications?

Admiral NAGLER. The Joint Chiefs of Staff have directed a [deleted] (Joint Strategic Planning Document fiscal year-84-91/JCS-2143/573 of 19 November 1981). The TACAMO aircraft needed to satisfy these requirements is affected by two factors:

1. The JCS (JCS-2056/556-6 of 30 November 1977) performance standard for communications [deleted]. The standard is established as the [deleted]. This standard, when combined with the [deleted] determines the location of [deleted].

2. The increased operational area capability of the Trident missile system. Employment of Trident will enable our SSBN's to deploy over a significant portion of the [deleted]. Our capability to realistically expand into all areas available, optimizing employment of the weapon system while [deleted].

These combined factors militate against continuing the TACAMO mission with an aircraft which, [deleted].

Senator **Warner**. Would you describe in detail for the record the various tradeoffs between fleet size, fuel consumption, range and payload capabilities, time on station, patrol area, dispersability and maintainability as they influence calculations of mission and cost-effectiveness?

Admiral **Nagler**. An analysis of alternatives to TACAMO was forwarded by Secretary of Defense Weinberger to the chairmen of the Senate and House Armed Services Committees on 25 January 1982. That assessment included considerable detail on DoD estimates of force levels and life cycle costs for various aircraft alternatives.

Force sizing, required ECX platform characteristics, operational and logistic factors are all dependent on the ability of the force to accomplish the TACAMO mission of the future. This requires on-station performance, and that is defined as [deleted]. The single mission requirement is the ability of an aircraft to get [deleted]. Candidates for ECX must be capable of carrying the [deleted] TACAMO communications suite.

The time and fuel to complete the mission will vary. For example, two aircraft types may be able to meet on station requirements even though one can only remain on-station [deleted] while the other can remain for [deleted] etc. Fleet size will vary accordingly. Other factors affecting force size include, for example, time required for pre-flight, post-flight, maintenance activities, etc. Fleet size determines manpower requirements, support requirements, etc., which in turn affects acquisition and life cycle costs. Fuel consumption is related to the type aircraft selected and to the fleet size required to perform the mission, and so on for the remaining factors.

Although the relationship among these tradeoffs can be defined, the specific impact can only be assessed when a particular aircraft is compared against mission requirements. Cost effectiveness of various ECX candidates will be evaluated based on their ability to meet mission requirements and deliver on-time for the most effective life cycle cost.

CRITICAL MISSION-RELATED LOGISTICS

Senator **Warner**. The intent of Congress in enacting legislative relief for DoD in the procurement of ADPE and services, was that all subsystems of the identified critical mission areas should be exempted from Public Law 89-306.

Is DoD implementing this legislation in a manner consistent with the Congressional intent insofar as mission-support logistics are concerned?

Mr. **Latham**. That is indeed our intent.

As you know, the language of that part of the Section is the area left most gray. To quote:

"(. . . the exemption . . .) does not include procurement of automatic data processing equipment or services to be used for routine administrative and business applications (including payroll, finance, logistics, and personnel management applications)."

In our interim guidelines, we did not interpret the legislation further believing that there are both routine and mission-critical logistics and that you intended that only the routine logistic applications, not all logistics systems, remain under the ambit of Public Law 89-306.

Unless the Congress takes exception, our guidelines in this area will contain language essentially as follows:

Excluded from Public Law 89-306.—Logistics systems which are deployed, provide direct support to operating forces, provide direct support to maintenance of weapons systems or are utilized for war planning.

Not Excluded from Public Law 89-306.—Systems supporting routine logistics functions such as many of those typically performed in contracting, accounting, headquarters management, disbursement and budgeting.

IMPACT OF UNIFORM PROCUREMENT CODE

Senator **Warner**. Would each of you comment for the record on the impact the adoption by the Congress of a Uniform Federal Procurement Code which did not differentiate between military and civilian agencies might have on procurement of specialized and critical military automatic data processing equipment and support services related to your respective areas of responsibility?

Mr. **LATHAM**. The Department has and will continue to support a Uniform Federal Procurement System responsive to the operating needs of the individual departments and agencies. Implicit in Executive Order 12352, Federal Procurement Reforms, the procurement process is necessarily subordinate to the Government's aims, particularly national defense. Your recent amendment to the Armed Services Procurement Act for computer resources recognizes this important relationship and should be carried forward into the Uniform Federal Procurement System. Furthermore, system acquisition policies should continue to provide for the procurement of embedded computer resources without utilizing special commodity-type ADP rules.

Admiral **NAGLER**. The Navy would anticipate no adverse ADP impact from a Uniform Federal Procurement System so long as two critical aspects of the current situation are retained in that code:

(1) The historical practice of acquiring embedded computer resources under regular procurement rules rather than special ADP rules must be continued. This covers equipment developed through the R&D process for tactical systems.

(2) The recent modification of the law to permit acquisition of mission critical ADPE outside the provisions of the Brooks Act is a major benefit to the Navy in assuring proper computer support for the fighting forces. Any new code should carry forward the language which you introduced as Section 908 of fiscal year 1982 Defense Authorization Act and should not impose significant narrowing of the guidelines issued by the Deputy Secretary of Defense in his Feb. 1, 1982 memo.

General **DAVIS**. Senator Warner, a uniform federal procurement system could greatly improve the acquisition process for both military and civilian automated data processing equipment and support services by providing a more streamlined and understandable baseline. As General Ellis discussed with you last year, the ADP acquisition process was badly convoluted with special laws, regulations and layers of bureaucratic overhead. Manpower and time were wasted processing the paperwork required to obtain critical computer equipment and services.

If a new uniform procurement system is adopted, it should be sufficiently flexible to allow military commanders, when necessary, to expedite the approval and acquisition process for data processing needs brought about by quick changes in national defense policies and guidance. Areas of special concern to SAC are those computer systems that support intelligence collection, tactical warning, war planning and command and control areas requiring the continuing flexibility afforded by your language contained in the fiscal year 1982 Defense Authorization Act.

We would be concerned if there were an interpretation of any new approach to federal government-wide procurement processes which negated or restricted the application of your initiative.

SECURE VOICE

Senator **WARNER**. What is being done to provide assured secure voice conferencing between the President and key military and civilian officials in the event of nuclear attack?

Mr. **LATHAM**. Conferencing between the President and key officials [deleted].

AIR DEFENSE

Senator **WARNER**. What are the specific Strategic C^3 system deficiencies that need to be corrected to adequately support CONUS Air Defense?

ANSWER. Surveillance and Warning Deficiencies. Currently, North American air defense surveillance is [deleted]. The existing network of ground-based air defense radars provides coverage of high and medium altitude threats, but has significant gaps [deleted]. Additionally, these systems are limited to line of sight and have a maximum range of approximately 200 NM which is less than the range of today's stand-off ASM's. Today's Soviet bomber/ASM vehicles are therefore able to operate outside or underneath the current North American surveillance system, thus providing the Soviets with [deleted]. In addition, if the threat is supersonic or involves the use of the long-range ASM, the system is [deleted]. With the current ground-based radar system and associated alert fighter force, the NORAD system is only able to [deleted]. Although seven E-3As (AWACS) designated for North American Air Defense could provide some mobile surveillance and control to meet the atmospheric threat, few additional AWACS are currently available to the NORAD mission due to commitment to other worldwide missions. If provided in sufficient number, AWACS has the capability to provide excellent surveillance and C^3 in the pre- and trans-attack phases of conflict. A discussion of all current air defense systems follows:

a. *Distant Early Warning (DEW) Line.*—Deployed in the 1950s, this 31-radar network is dedicated to the early tactical warning role. The DEW Line should provide detection and initial assessment of a medium to high altitude atmospheric attack against North America. However, this aging system uses first generation electronics with vacuum tube technology, is subject to frequent site outages, and is increasingly difficult and expensive to maintain. Many parts and components are no longer stocked, or, in some cases, even produced in the United States and experienced contractor personnel are in ever increasing supply at ever increasing cost. The DEW Line has several gaps which [deleted] since its coverage is [deleted] (AGL).

b. *Iceland Surveillance.*—Two long range radars in Iceland for island defense and primarily in support of CINCLANT extend the DEW eastward to assist in early detection of possible attack on North America. A large [deleted]. A detachment of two AWACS is deployed to Keflavik AB, Iceland; however, these aircraft are not under NORAD control.

c. *Alaskan Air Command (AAC) Radars and Associated System.*—The 13 military radar sites are currently being upgraded with the SEEK IGLOO deployment of Minimally Attended Radars (MARs), to be completed by the [deleted]. These AAC radars are assigned broader duties than the DEW Line and Iceland radars. The new MARs will be data-tied to the Alaskan ROCC to provide tactical warning, command and control of air defense engagement forces and airspace control. This network only provides radar surveillance for the western coast and portions of interior Alaska, [deleted].

d. *CADIN/Pinetree Line.*—This 24-radar network across southern Canada has a broader role than the DEW Line and Iceland radars. Like the AAC radars, CADIN/Pinetree provides tactical warning, tracking and attack assessment information against intruders and command and control of engagement forces. Never designed for low altitude coverage, this network does [deleted]—an important consideration when engagement forces are being controlled. The CADIN/Pinetree radars are data-tied to the appropriate ROCCs. These radars experience maintenance problems similar to those of the DEW Line. Some parts, no longer produced in the West, must be obtained from Communist nations. Supportability in the late 1980s is suspect.

e. *Joint Surveillance System (JSS).*—The JSS consists of 14 radars in Alaska (13 military, 1 FAA), the four CONUS ROCCs, and a series of radars deployed around the periphery of the CONUS. These CONUS JSS radars—10 military, 5 FAA, and 31 joint military and FAA—have replaced the current purely military radar network and a substantial manpower saving has been achieved. The JSS CONUS radars have the same general functions and limitations as the CADIN/Pinetree line and the present Alaskan radars. Additionally, they have no ECCM capability. The military effectiveness of JSS CONUS radars against low altitude threat will be minimal. The JSS ROCCs will function as the primary command and control center during crisis or attack for as long as they are capable. Command and control will be transitioned to the E-3A for survivability as the tactical situation warrants.

f. *Current Communications Support.*—While present command and control of air defense forces is carried out over point-to-point leased commercial communication lines, it is timely and effective in peacetime. However, most point-to-point communications and the present ground-air-ground communications system are nonsecure. Furthermore, current communications to the new [deleted] for warning of potential air-to-surface missile attacks. In addition, there is little likelihood that the total system would remain in operation following direct attack. Finally, the majority of air defense C^3 components are neither blast nor EMP hardened; the only potentially survivable elements of the system are the NORAD command post, the Canadian North Bay Complex, and AWACS.

WARNING CAPABILITIES

Senator **Warner**. How are the Strategic C^3 System deficiencies affecting CONUS Air Defense different, if any, than the system's deficiencies affecting Ballistic Missile and Space Defense?

Answer. Our peacetime capabilities for warning of ballistic missile attack and for cataloging and tracking satellites in support of the space defense mission are reasonably adequate with the exception or the lack of radar coverage to the Southeast and Southwest of CONUS for SLBM attacks. The two new PAVE PAWS radars will close this gap.

Coverage and timeliness of the [deleted] missile attack launch detection sensors is generally adequate, but lacks full dual-phenomenology reinforcement from ground-based radars for detection of the missiles in flight. Our principal deficiency for missile attack warning is in the vulnerability of the [deleted] sensors [deleted]. With regard to ballistic missile defense as such, we do not have a supporting C^3 system in place.

The sensors which provide space defense support are fixed, ground-based systems and are therefore vulnerable to attack. Deficiencies of communications and command centers are the same as for air defense.

Senator **WARNER**. Are the C^3 deficiencies affecting CONUS Air Defense more critical than the C^3 deficiencies affecting Space or Ballistic Missile Defense? Please explain.

ANSWER. Answering this question requires some examination of DOD priorities for Strategic defense. Presently, deterrence depends on the ability to retaliate in the event of a strategic nuclear attack rather than an active defense of an attack. In order to take the proper actions for NCA and strategic force survivability and then retaliate, the system is highly dependent on unambiguous tactical warning once an attack has been initiated. This is the first priority. Currently, DOD has a credible capability to provide tactical warning of a ballistic missile attack although there are some deficiencies. The capability to warn of an ASAT attack against one of our satellites is limited but probably less critical considering present Soviet capabilities and the fact that ASATs do not directly attack the CONUS. Tactical warning of a bomber attack, on the other hand, is almost nonexistent. Studies have shown that it is possible for the Soviets to [deleted]. This could [deleted] and delay or prevent tactical warning of a following missile attack. Therefore, until there is sufficient [deleted] C^3 deficiencies in Air Defense are the most critical.

Senator **WARNER**. What specific measures is the Administration taking to correct the C^3 deficiencies affecting CONUS air defense?

ANSWER. These measures are outlined in the DOD Air Defense Master Plan recently submitted to Congress by the Secretary of Defense. Briefly, the items visible in the fiscal years 1983-87 FYDP are:

a. Deploy two 180 degree fan over-the-horizon-backscatter (OTH-B) radars on the east and west coasts and a 120 degree fan to cover southern approaches.

b. Upgrade the DEW Line with minimally attended long range radars and unattended short range gap filler radars.

c. Procure 12 AWACS for North American air defense and for random AWACS patrols of North American Airspace [deleted].

Senator **WARNER**. What is the total estimated cost (in fiscal year 1982 dollars) to correct these deficiencies?

ANSWER. The total estimated cost for C^3 and Surveillance improvements related to North American Air Defense over the fiscal years 1983-87 timeframe in then year dollars is $3.9 billion. Approximately $2.4 billion is for E-3A procurement and flying hours. The remaining $1.5 billion procures the OTH-B radars and DEW Line radars.

Senator **WARNER**. What specific funds is the administration requesting in the fiscal year 1983 budget for CONUS Air Defense C^3 systems?

ANSWER. The fiscal year 1983 budget includes $87 million for OTH-B, $39 million for DEW Line and $41 million for E-3A long lead procurement (fiscal year 1983 then year dollars).

MILSTAR

Senator **WARNER**. What is DOD's current estimate, by year of amounts, of funding necessary to assure an IOC of [deleted] for MILSTAR? How does this estimate compare with the Air Force's current planned funding profile?

Mr. **LATHAM**. First I would like to make it clear that there are no differences between the Air Force and DOD (OSD) funding estimates for MILSTAR. We and the Air Force are in complete agreement on MILSTAR funding requirements.

In spite of the fact that we don't have any differences on MILSTAR funding, there is a problem. When the fiscal year 1983 budget was put together we did not have definitive data on the funding that would be required in fiscal year 1983 and we estimated that about $80 million would be sufficient. It is important to point out that because of the high priority of the MILSTAR program, our $80 million request was not reduced in internal budget negotiations. MILSTAR received every dollar we requested. Later, after the fiscal year 1983 budget was submitted, the Air Force completed more detailed estimates of what would be required to proceed with full scale development in fiscal year 1983 and meet a first launch in [deleted]. The Air Force analysis showed that about $132 million would be required in fiscal year 1983. Consequently, we have a fiscal year 1983 funding shortfall of about $52 million. If an additional $52 million is not available in fiscal year 1983, then the Air Force estimates that the first launch will be delayed to about (fiscal year [deleted]). We view the (fiscal year [deleted]) first launch date as critical because of the absolute requirement to ensure connectivity from the NCA to the forces and from the forces to the NCA under conditions of intense system stress such as jamming and the effect of nuclear weapons. Our current dependence on vulnerable military and leased commercial communications for SIOP execution, emergency action messages, warning information, and other strategic communications is (not deemed acceptable) and this MILSTAR will (fill a terribly important requirement for survivable and enduring communications).

Senator **Warner**. Will DOD's estimate of necessary funding provide MILSTAR LASERCOM crosslinking and satellite maneuverability? Does the current Air Force funding profile provide for these capabilities?

Mr. **Latham**. The estimates include the funding to develop a maneuvering capability for MILSTAR and [deleted] crosslinks for satellite-to-satellite relay of military command and control traffic. The estimates also include designing the satellite bus to accommodate higher data rate LASERCOM crosslinks which we plan to add at a later date.

FLTSAT NO. 7

Senator **Warner**. What is the current estimated cost for FLTSAT No. 7 without an EHF capability (including procurement and launch costs). What is the estimated cost of FLTSAT No. 7 with an EHF capability (including R&D, procurement, and launch costs listed separately)?

Admiral **Nagler**. Without an EHF capability FLTSAT No. 7 estimated total costs are $194 million including $122 million for spacecraft and launch vehicle procurement, $54 million for launch support costs and $18 million in program support. With an EHF package integrated in FLTSAT No. 7 estimated total costs will be $330 million with $136 million RDT&E for the EHF transition applique. There is no procurement or additional launch costs. The $136 million is for the first EHF package on FLTSAT No. 7 due to development cost. The cost of an EHF package for FLTSAT No. 8 would only be $26 million since the develpment cost is borne by the first package.

Senator **Warner**. What is the degree of confidence that FLTSAT No. 7 with capability can be on-orbit and operational by 1986.

Admiral **Nagler**. There is a high degree of confidence that FLTSAT No. 7 can be launched with an EHF package during fiscal year 1986 and the progress to date supports this milestone. However, as stated by Lt. Gen. Richard Henry, USAF, Director of Space Division, USAF, during a Subcommittee Hearing on 25 March 1982, the funding profile must be adjusted to meet that launch date.

FLTSAT NO. 8

Senator **Warner**. What is the determining factor as to whether FLTSAT NO. 8 should have an EHF capability?

Admiral **Nagler**. The determining factors for an EHF package of FLTSAT No. 8 are two fold:

a. The successful launch and on-orbit operation of the package of FLTSAT No. 7.

b. The MILSTAR schedule not slipping from an initial launch of [deleted].

Gen. Henry, USAF, Director Space Division, USAF, has stated that the EHF transition appliques will continue significantly to the development of the MILSTAR spacecraft. The EHF appliques are also critical to the EHF terminal program development and will permit pre-production design changes if such changes are found to be necessary.

Senator **Warner**. If MILSTAR can achieve IOC by [deleted] how critical will the need be for FLTSAT No. 8?

Admiral **Nagler**. There will be a continuing need for [deleted]. This need, indepedent of the MILSTAR System, is due to the large DOD population of UHF users in operation today and the resulting terminal investment. The FLTSAT program provides a minimun risk platform with known capabilities and will serve [deleted]. In addition, [deleted].

LATEST ACCEPTABLE DATA FOR MILSTAR IOC

Senator **Warner** If FLTSAT's Nos. 6, 7, and 8 were procured and successfully launched as planned, what would the latest acceptable date be for a MILSTAR IOC to ensure continuity of two-way satellite communications for SIOP forces (at equatorial orbits only ignoring polar orbiting MILSTARs)?

Answer. Four geostationary satellites are required to meet military requirements. Based on the most recent statistical projection, the FLTSAT population will drop below four in late [deleted]. To assure continuity of service for SIOP forces a MILSTAR launch is required in this time period.

FLTSAT NO. 8

Senator **Warner**. What is the estimated cost of FLTSAT No. 8 without EHF? With EHF?

Admiral **Nagler**. Without an EHF capability FLTSAT No. 8 estimated costs total $207 million, $127 million for the launch vehicle and spacecraft, $60 million in launch support costs and $20 million in program support costs. With an EHF package integrated in FLTSAT No. 8 estimated costs will total $233 million.

GAPFILLER

Senator **Warner**. Is DOD requesting funding for continuation of Gapfiller service in 1983?

Admiral **Nagler**. Yes. $13 million in fiscal year 1983 funds are being requested to continue DOD service from all three Gapfiller satellites.

Senator **Warner**. Since Gapfiller was to serve until FLTSAT reached FOC, why is continuation of Gapfiller needed?

Admiral **Nagler**. In order to improve Defense-wide command and control, decrease the cost of operation and to reduce American force presence overseas (e.g., the closure of Naval Communication Stations Londonderry, Morocco, Asmara and HF reduction at others. [deleted]. We are faced with the need to continue UHF satellite service for the present and foreseeable future because of the large DOD population of UHF users in operation today. Today, DOD is served by two DUHF satellites: FLTSAT and Gapfiller. While Gapfiller is still available, its capacity is being used to augment that of FLTSATCOM. However, in a contingency situation which, for example, calls for rapid deployment of quick reaction forces, [deleted] LEASAT, which is expected to be launched in fiscal year 1984, will replace the capability now provided by Gapfiller.

LEASAT

Senator **Warner**. What is the most recent estimate of the first launch of a LEASAT satellite?

Admiral **Nagler**. The first LEASAT is presently scheduled for launch in the space shuttle on 5 June 1984. It will be ready for delivery by 1 December 1983 and available for an earlier launch if required and the shuttle is available.

WWABNCP FOCAL POINT

Senator **Warner**. Is there a central focal point in DOD for operational, resource, and financial management of the WWABNCP program? Please explain why there is or is not.

Mr. **Latham**. Since 1967, the USAF has been the DOD Executive Agent and Single Manager for the WWABNCP system. Program management responsibility is assigned to the AF Logistics Command.

Operational control of the WWABNCP resides with the users (CINCSAC, CINCLANT, CINCPAC, and CINCEUR), under the overall cognizance of the Joint Chiefs of Staff.

WWABNCP funding is defined in the normal manner, through the PPBS cycle, and is contained primarily in AF Program Elements.

Funding, program management and operations are monitored by Headquarters US Air Force, OJCS, and by the DUSD (C^3I).

WWABNCP EQUIPMENT COMMONALITY

Senator **Warner**. Is the communications equipment on WWABNCP for CINCLANT the same as the equipment for CINCEUR AND CINCPAC? Please explain.

Mr. **Latham**. CINCLANT uses two EC-135P aircraft, one EC-135H aircraft and one EC-135C. CINCEUR uses four EC-135H aircraft. CINCPAC uses four EC-135J aircraft. The communications equipment aboard these aircraft, as shown below, is substantially the same.

Equipment	EC-135C	EC-135H	EC-135J	EC-135P
ARC-34 UHF radio	×	×	×	×
ARC-186 VHF command radio	×	×	×	×
ARC-89 UHF radio	×	×	×	×
ARC-58 HF radio	×	×	×	×
ARC-96 VLF/LF radio	×	×	×	×
ASC-21 AFSATCOM terminal	×	×	×	×
Multiplexing subsystem	×	×	×	×
ARA-60 secure digital data	×	×	×	×
KY-3A secure digital data	×			
WILCOX 807A (VHF command radio)				×

C³ EQUIPMENT FOR WWABNCP

Senator **Warner**. How many agencies (military) are involved in designing and developing C³ equipment for WWABNCP? If different military services are involved, how is R&D and procurements budgeted or funded?

Mr. **Latham**. As the DOD Executive Agent for the WWABNCP system, HQ USAF has designated the AF Logistics Command as the responsible agency for management of WWABNCP resources. A WWABNCP System Program Office has been established within AFLC for this purpose. The WWABNCP SPO is responsible for effective and integrated management of WWABNCP airborne resources in support of WWMCC systems, and is the focal point for all management actions affecting the conception, definition, and acquisition of WWABNCP systems.

The AF Systems Command provides research, development and transfer (to AFLC) of major WWABNCP acquisition programs.

Responsibility for equipment/system acquisition/modification programs common to multiple systems is assigned to the appropriate agency, with participation and support by the WWABNCP System Program Office (SPO) relative to unique WWABNCP requirements. The SPO is normally the prime manager for implementation/modification programs necessary to integrate these new capabilities into the existing WWABNCP system.

WORLDWIDE AIRBORNE COMMAND POSTS

Senator **Warner**. How are the CINCs WWABNCP C³ requirements validated and funded?

Answer. CINC WWABNCP C³ requirements are validated by the Joint Chiefs of Staff and forwarded to the appropriate military department for funding. The normal chain of events is as follows:

(1) A CINC develops a Required Operational Capability (ROC) for his Airborne Command Post. The ROC is submitted to the OJCS with copies to the other CINCs. The CINCs must comment on the applicability of the ROC to their theatre. Since the WWABNCP is an integrated system, most ROCs apply to all CINCs and the ROC then becomes a Multicommand Required Operational Capability (MROC).

(2) The OJCS then has a Technical Analysis/Cost Estimate prepared to determine technical feasibility and budgetary data.

(3) After receipt of the TA/CE, a formal JCS validation process is begun which results in the formal validation of the requirement, establishment of a lead agency and establishment of a funding profile. The validated requirement is forwarded to the appropriate military service (usually the Air Force in the case of the WWABNCP) for implementation. The requirement then competes for funding within the Defense Budget cycle.

NATIONAL EMERGENCY AIRBORNE COMMAND POST (NEACP) BASING

Senator **Warner**. What is the basis for basing the NEACP at its current location?

Answer. A July 14, 1977 National Security Advisor memorandum for the Secretary of Defense, subject: "NEACP Availability," is quoted in its entirety: [Deleted].

The above quoted memorandum has been neither rescinded nor amended.

NEACP, WWABNCP AND TACAMO AIRFRAME COMMONALITY

Senator **Warner**. What is the rationale for having different airframes for NEACP, WWABNCP, and TACAMO aircraft?

Mr. LATHAM. The NEACP aircraft are E-4s; the WWABNCP aircraft are EC-135s; and the TACAMO aircraft are EC-130s. The rationale for the use of different airframes is that, both at the time these systems were procured and today, there is no one airframe that will satisfy the different operational requirements of the NEACP, WWABNCP and TACAMO missions.

For example, the NEACP mission has been transferred from EC-135 aircraft to E-4 aircraft because the EC-135s do not have enough weight, space, and power to accommodate the people and equipment needed to accomplish the NEACP mission. The EC-135 aircraft cannot accomplish the TACAMO mission because they cannot perform the operational maneuvers (a tight orbit) necessitated by the TACAMO mission. The E-4 is unsuitable for the TACAMO and WWABNCP missions because it is too large and costly. The EC-130 TACAMO aircraft are too small for either the NEACP or WWABNCP role. (Some modern airframes could perform several missions: the E-3 airframe, for example, could be used for either the TACAMO or the WWABNCP mission.)

WORLD WIDE AIRBORNE COMMAND POSTS

Senator WARNER. How will he Ground Mobile Command Centers (GMCC) currently under development affect the number of WWABNCPs that will be required?

Mr. LATHAM. To better describe developments to be initiated under this program, the term "ground" has been eliminated and the program retitled "Mobile Command Center (MCC) Program." The MCC will become the fourth command center element in the National Command Center System (NMCS). Currently the NMCS consists of two fixed command centers: the National Military Command Center (NMCC) the Alternate National Military Command Center (ANMCC); and one air-mobile command center, the National Emergency Airborne Command Post (NEACP). [Deleted.]

The NEACP is essential [deleted] because the fixed command centers are unlikely to survive the initial attack, while NEACP (when airborne) has a very high probability of survival. In addition, the NEACP provides the capability to respond promptly and effectively to the initial attack, thereby providing essential command, control and communications (C^3) [deleted].

The situation of the current fixed and airborne command centers of the nuclear-capable CINCs is analogous to that of the NMCS: they provide effective peacetime command of forces, and the capability (when airborne) to survive and respond to an initial attack, [deleted]. Hence, there is again a need for a third-level command center capability—the MCC.

Therefore, the development of the MCC will not materially affect the need for, or utility of, airborne command centers. The MCCs and the ABNCPs are complementary C^3 capabilities which, together with the fixed command centers, provide a strategic C^3 system capable of spanning the full spectrum of modern warfare, from crises operations through execution of an initial nuclear exchange and conduct of a prolonged nuclear war to conflict termination.

EMP HARDENING

Senator WARNER. What are the advantages of EMP hardening aircraft hulls versus EMP hardening the onboard C^3 equipment?

Mr. LATHAM. EMP hull hardening [deleted] adequate shielding for very sensitive equipment. It does [deleted] example. Further, [deleted].

LF/VLF TRAILING WIRE ANTENNAS

Senator WARNER. What is the status of improving the LF/VLF trailing wire antennas for WWABNCP and TACAMO C^3?

Mr. LATHAM. Modification of the WWABNCP LF/VLF trailing wire drogue is underway. [Deleted.]

Improvements to the TACAMO LF/VLF trailing wire antenna are also underway: [deleted] and there is a TACAMO program which continually assesses TACAMO maintainability and reliability (including the trailing wire antenna subsystem), in order to assure the best possible mean time between failure for all TACAMO subsystems.

STRATEGIC (NUCLEAR) INFORMATION SYSTEMS

Senator WARNER. What DoD activity is responsible for determining whether existing Strategic (Nuclear) Information Systems are consistent with and adequately supporting national policies and priorities? Explain how this DoD activity carries out its responsibility.

Answer. The Deputy Under Secretary of Defense (Communications, Command, Control and Intelligence) (DUSD (C^{3}I)) is responsible for establishing defense policy and procedures and for promulgating the guidance necessary to insure that strategic information systems are consistent with and adequately support national policies and priorities. The Joint Chiefs of Staff are responsible for determining whether existing strategic information systems are consistent with and adequately support the DUSD (C^{3}I) guidance. This responsibility is met by the conduct of such national level, JCS sponsored exercises as the recently completed IVY LEAGUE exercise. The users of the systems, the Commander in Chief, the Joint Chiefs of Staff, and the Chairman, JCS, (in the case of the National Military Command System) state their needs for systems to implement the national military strategies and objectives. These requirements are reviewed by the JCS and, if validated, referred to the appropriate DoD agency for implementation. The Secretary of Defense, with the assistance and advice of the Defense Resources Board (DRB) provides the ultimate approval by incorporating funds into the DoD budget. National policies and priorities are considered by the DRB during the DoD budget review process. Therefore, in the case of new requirements, the DRB and the Secretary of Defense exercise their authority to insure compliance with national policies and priorities and, in the case of existing systems, the Joint Chiefs of Staff are responsible for this function. If existing systems are incapable of implementing national policies, deficiencies are noted and requirements for improvement are stated by either the users or the JCS. Such deficiencies, revealed during JCS scheduled exercises usually result in evolutionary changes in the strategic (nuclear) information systems.

Senator Warner. How often and to what extent are the Strategic (Nuclear) Information Systems requirements examined to determine need and utility of each system?

Answer. Need and utility of strategic (nuclear) information systems are examined through analyses, exercises and tests. Analyses are done on an as needed basis generally in conjunction with changes in program planning, threat or policy. For example, A thorough review of Strategic C^3 systems was conducted last summer and the results reported to the President in August 1981. A number of major program initiatives and procedural changes resulted from that review. Also a master plan for the acquisition and employment of strategic nuclear systems is now being developed jointly by USDRE and USDP and will be completed this summer. Exercises and tests are conducted regularly. [Deleted] testing most strategic (nuclear) information systems. Smaller exercises are conducted more frequently. For example, [deleted] exercises which test strategic connectivity are held [deleted] Vigilant Overview exercises involving chiefly NORAD and SAC with National Military Command Center participation are also held four times a year. Functional process tests are conducted in conjunction with the exercises or separately. These focus on a specific function such as tactical warning or resource capability reporting and assessment. Other exercises are conducted by the nuclear capable CINCs such as SAC's Global Shield exercise every year which tests, among other things, the command nuclear information systems.

Senator Warner. How and to what extent do the Strategic (Nuclear) Information Systems, or in place WWMCCS, inhibit or constrain new technological developments? (Is what exists constraining the implementation of what should be?)

Answer. Existing systems are not constraining technological developments. One key to insuring that existing strategic nuclear information systems do not so constrain is to provide an architecture which flexibly accommodates both the old and the emerging modernized systems. The WWMCCS Information System (WIS) is a good case in point. An architectural approach is preferred which will permit the existing and aging ADP to continue on-line during the phased modernization. Those requirements which are common among several commands will be met with standard hardware and software. This approach achieves the efficiencies and economies which can be realized from single procurement and development efforts. The major commands will, however, independently develop systems to meet unique requirements. The functions of tactical warning, attack assessment and space defense, in particular, are being independently modernized in a program not constrained (except for communications interfaces) by the overall WIS modernization. This is not an easy modernization problem to solve. The high degree of complexity inherent in existing multiple source, inter-related and interfaced C^3 systems obviously creates a difficult challenge. In the case of the WIS and related strategic information systems, we are meeting that challenge.

Senator Warner. What are DoD's plans and costs for upgrading or replacing the existing strategic (nuclear) information systems (list separately for each system)? What are the bases for upgrading or replacing these systems? Will increased funding levels expedite the resolving of existing system deficiencies? What impact will decreased funding have on current planning schedules?

Answer. Our strategic nuclear information systems can be generally categorized as those systems which provide and display Ballistic Missile Tactical Warning and Attack Assessment (TW/AA) information, those systems which support the development and production of the national war plan, and those portions of the WWMCCS Information System which support nuclear operations and planning.

PLANS AND COSTS

There are two primary command and control computer systems that provide and display missile warning information used for strategic (nuclear) decision-making. One of these systems, the Command Center Processing and Display System (CCPDS) employs computers at North American Aerospace Defense Command (NORAD), Strategic Air Command (SAC), the National Military Command Center (NMCC), and the Alternate National Military Command Center (ANMCC) to process and display ballistic missile TW/AA information. The other system, 427M, is located within the NORAD Cheyenne Mountain Complex (NCMC) and supports the NORAD missions of ballistic missile threat assessment, atmospheric surveillance, and command and control of NORAD air defense assets. [Deleted.] The fiscal year 1983 DoD budget submission contains funds to support replacement of these computers. Efforts to replace the CCPDS are underway. Fiscal year 1984 funds will procure the CCPDS replacement development system and initiate software development. Fiscal year 1985 resources procure the hardware for the four CCPDS sites. Fiscal years 1985–1987 funds continue the software development effort. CCPDS replacement initial operational capability (IOC) is slated for fiscal year 1987. Within the NCMC, two major programs have been initiated to replace the Communications System Segment (CSS) and the NORAD Computer System (NCS). The CSS serves as the "front end" communications processor for the NCMC. Due to the complexity of the existing CSS, the system will be replaced in several phases. The first phase will provide a new interface system for ballistic missile TW/AA circuits; follow-on phases will support the space defense, atmospheric surveillance, and common-user communications requirements of the NCMC. Fiscal year 1982 funds are being used for competitive contractor concept definition of the replacement system's arthitecture. Fiscal year 1983–85 funds acquire the hardware and develop the system protocols and software needed for Phase I of the CSS replacement. Fiscal year 1986 funds provide follow-on software efforts and operation and maintenance of the Phase I segment. An fiscal year 1986 IOC for CSS replacement, Phase I, is planned. Phase II acquisition will be initiated in fiscal year 1988. The NCS is the primary missile warning processor in the NCMC. Development system hardware will be produred in fiscal year 1984. The hardware for the operational NCS replacement system will be bought in fiscal year 1986. Fiscal year 1984–87 funds also support the software conversion and development efforts for this system. IOC has been scheduled for fiscal year 1988. The cost for these replacement programs encompasses $2.4 million in fiscal year 1982, $6.2 million budgeted in fiscal year 1983, and $131.4 million programmed in fiscal year 1984 through fiscal year 1987.

The TRIAD Computer System (TRICOMS) is the primary computer system supporting the development and production of the national war plan. Modernization plans include acquisition of hardware, system software, contractural services and ADPE maintenance to provide war planning modeling, computer networking and file management capability. Cost for these upgrades is approximately $6.6 million per year.

Other on-going modernization activities include upgrading of the strategic nuclear operations capability, especially the near term evolution of the General War System ADP which provides Nuclear Operations Monitoring and Residual Capability Assessment for the National Military Command System (NMCS). This upgrade is a critical element of the larger C^3 architecture for improved strategic nuclear decision support. Present plans call for the expenditure of $16 million during fiscal years 1983/84 to provide an austere ADP capability on four National Emergency Airborne Command Post (NEACP) aircraft.

BASIS FOR MODERNIZATION

Replacement of our present ballistic missile TW/AA computers within NORAD, SAC, the NCMC, and the ANMCC, is driven by several factors:

a. [Deleted.]

b. Additional TW/AA sensors (PAVE PAWS Southeast and Southwest) have been programmed to eliminate gaps in our present SLBM coverage.

c. [Deleted.]

d. In addition to the severe growth limitations of present NCMC TW/AA systems and the CCPDS, systems reliability and maintainability issues have prompted replacement efforts. NCMC and CCPDS computers are based upon mid-1960 technology, and will be approaching the end of their life cycle by the mid-1980s. It is essential that new systems be developed and reach operational status before that date.

These four significant factors—[deleted] increased processing workloads [deleted]—make computer replacement mandatory.

Areas of functional requirements growth necessitating TRICOMS upgrades are war planning needs to include Air Launched Cruise Missile (ALCM), Nuclear Weapons Employment Plan, SAC contingency planning, and Ground Launched Cruise Missile (GLCM) coordination with the SIOP.

IMPACT OF INCREASED FUNDING LEVELS

The President must weigh carefully all of the needs of the Federal Government, and compare them against each other and against the revenues available to meet such needs. Therefore the President's Budget is a balanced one, reflecting overall national priorities. The Defense portion of the budget is likewise balanced and indicates the Secretary's considered prioritization of programs against which the available resources should be applied. It would thus be inappropriate for an official who is in charge of only a portion of the Defense budget, to support efforts to increase funding in that area.

IMPACT OF DECREASED FUNDING LEVELS

Any reduction in the current funding levels for TW/AA programs would adversely impact the replacement programs for critical NCMC and CCPDS systems. The NCMC TW/AA processors and the CCPDS are only two links in the end-to-end ballistic missile TW/AA system. In many case, upgrades to NCMC TW/AA and CCPDS computer systems are driven by concurrent improvements in other segments of the overall TW/AA system. Conversely, these computer replacements are also prerequisites for other follow-on improvement to the end-to-end system. This intimate interdependency of missile warning sensors, communications and command centers characterizes the TW/AA "system of systems." As a result of this relationship, any NCMC or CCPDS computer upgrade must be accomplished in concert with the overall TW/AA system architecture. If funding for computer replacement programs is reduced, the scheduled operational dates for these acquisitions would slip. Consequently—and more significantly—schedules for other planned and programmed TW/AA systems improvements would be seriously impacted if we delayed replacement of the NCMC and CCPDS computers.

Reduction in TRICOMS funding would seriously impact the operational date for integration of the ALCM and GLCM into the national war plan. Thus strategic war planning requirements would not be satisfied, and there would be a degradation of quality of the SIOP and contingency planning.

Senator **Warner**. How will these systems assist the NCA and CINCs during a protracted nuclear war when decisionmaking must be made on airborne command posts?

Answer. As was highlighted during the testimony, most of the programs requested in the fiscal year 1983 budget are directed [deleted]. Every effort is being made to insure that the NCA and CINCs are provided sufficient and adequate information to support decisionmaking.

STRATEGIC C^3

Senator **Warner**. What is the basis for EMP hardening both the current C^3 equipment and the aircraft hull when the current C^3 equipment will be replaced with new EMP hardened C^3 equipment?

Admiral **Nagler**. The basis for EMP hardening TACAMO equipment now is [deleted] from the program in the shortest possible time and in the most economical manner. Along with the introduction of a hull-hardened ECX, our intention is to harden the [deleted] newest EC-130s. These new aircraft (plus the R&D aircraft) would produce [deleted] by fiscal [deleted] and allow for scheduled major aircraft maintenance. The best technical approach to EMP hardening is [deleted]. Aircraft hull hardening is accomplished to [deleted] additional hardening of [deleted] to achieve the necessary level of hardening for equipment survivability. The [deleted] protection is required to ensure EMP hardness. The intent with ECX is to install the current TACAMO C^3 equipment in a new air vehicle with minimum modifications. Some redesign of the EMP-hardened kits for C^3 equipment protection may be required to accommodate the installation in the new airframe.

Senator WARNER. How much weight will be added to the EC-130 aircraft by EMP hardening? How much overweight will the aircraft be with EMP hardening? How will this added weight affect the speed and range of the aircraft?

Admiral NAGLER. Full EMP protection will add about [deleted] to the EC-130. The current EC-130 is operated [deleted] pounds over design weight. Addition of EMP hardening will result in EC-130's operating between [deleted] pounds above design weight. Addition of the [deleted] will reduce the flight time by about [deleted] minutes and range by about [deleted] miles, if the airspeed is held constant.

Senator WARNER. What is the estimated cost per aircraft for EMP hardening (List separately [deleted]? How many E3/aircraft will be EMP hardened? Does the current Navy funding profile provide for this hardening?

Admiral NAGLER. The estimated cost for EMP-hardening each EC-130 is $10.1M (fiscal year 1981 $). This is broken down as follows:

	Millions
[Deleted]	$4.1
[Deleted]	3.7
Installation	1.6
Spare parts	.7
Total	10.1

The plan is to harden the [deleted] newest EC-130s with all [deleted]. These [deleted], plus the Research and Development aircraft, would produce [deleted] aircraft which would comprise [deleted]. Funding for the hardening of these aircraft is in the Five Year Defense Program of January 1982.

Senator WARNER. What is the current status of the 616A/VERDIN program for TACAMO?—for the timing standards and trailing wire antenna improvements?

Admiral NAGLER. The VERDIN system is the Navy ELF program. The 616A program is the Air Force VLF communications counterpart. The VERDIN system is operating highly successfully at this time. The TACAMO aircraft currently have [deleted].

The Defense Communications Agency is directing an ongoing series of tests to verify the interoperability of the Navy and Air Force systems. Full interoperability is scheduled for [deleted].

The Navy has several improvements under development for the TACAMO communication suite, and among them is [deleted]. A full scale development contract for such a [deleted] is expected to be awarded in the near future.

An [deleted] has been developed and tested for TACAMO which increases the [deleted]. Production is underway for this new [deleted]. Studies have also been initiated for several alternative [deleted] designs to reduce weight and further increase efficiency.

REDUCTION IN NAVSTAR SATELLITES

Senator WARNER. Will the reduction from 24 to 18 satellites impact the accuracy, coverage and availability required to meet both military and civilian user needs? What user requirements will not be met with the 18 satellite system?

ANSWER. The reduction from 24 to 18 satellites will impact the accuracy and coverage provided by GPS; however, no user requirements are not met with the 18-satellite configuration. Navigation accuracy will be reduced to 15 meters Spherical Error Probable (SEP) but will still provide up to two orders of magnitude improvement over current systems. For less than one-half hour (usually less than 10 minutes) in a 12 hour period, the high quality GPS coverage will degrade in a few small and predictable geographic areas. Military operations can be planned around these isolated gaps in coverage. The system availability requirement will still be met.

POTENTIAL USERS DROPPING FROM NAVSTAR

Senator WARNER. What potential users dropped out of the program due to the reduced satellite system, if any?

ANSWER. None.

RATIONALE FOR RESTRUCTURING NAVSTAR SYSTEM

Senator WARNER. What was the rationale for restructuring the system (quantify any increases or decreases in life cycle costs)?

Answer. In the process of reviewing programs to look for the most cost effective approach for the fiscal year 1981 President's Budget submission, the Department of Defense and the Air Force agreed that the program could be restructured to save substantial sums while still satisfying essential requirements.

Changing the operational constellation from 24 to 18-satellites reduces the number of satellites required and will lower the cost of the system by approximately eight hundred million (fiscal year 1979 dollars) during the first 15 years of operation.

SYSTEMS REPLACED BY NAVSTAR GPS

Senator **Warner.** What existing system(s) will GPS replace?

Answer. Based on the Service Coordinated Office of the Joint Chiefs of Staff Master Navigation Plan the following systems will be phased out:

Ground Low Frequency Automatic Direction Finder/Non Directional Beacons; Navy Ground Ultra High Frequency Direction Finders; Very High Frequency Omnidirectional Range (VOR) (1); All Services' Shore Operations Aircraft Tactical Air Navigation (TACAN) (2); Long Range Navigation (LORAN); Navy Navigation Satellite System (TRANSIT); Army and Air Force OMEGA; High Altitude Electronic Altimeters (3).

Notes: (1) GPS and Microwave Landing System receivers must be installed before the aircraft VOR set can be removed for those aircraft where VOR and Instrument Landing System receivers are combined. (2) Ground stations will be retained until the majority of aircraft are GPS equipped and NATO requirements terminate (CY 1995). (3) Further study required to definitize phase out planning.

ADEQUACY OF THE FYDP FUNDING PROGRAM

Senator **Warner.** Is the current FYDP funding adequate to provide for the currently planned program? If not, why not?

Answer. Yes, with Congressional approval of the proposed reprogramming the current funding is adequate to meet the Navstar GPS 1988 three dimensional capability using a block buy of 28 satellites.

QUESTIONS SUBMITTED BY SENATOR STROM THURMOND

Senator **Thurmond.** Dr. Latham, survivability of C^3I assets is a key issue in our deterrence posture. Without hardened, survivable C^3I, the threat of a highly effective second strike will be negated. In what timeframe do you estimate the United States will have a hardened C^3 capability?

Mr. **Latham.** Our approach for providing a survivable and enduring C^3 capability is based on a [Deleted]. Given the nature of the Soviet missile force capabilities, we have determined that the best approaches are to have the C^3 facilities which are [deleted] we can ensure their continued operation by a combination of the [deleted] attributes referred to above. Our program will provide different portions of this capability at various timeframes. It is expected that major implementation efforts will proceed through the end of CY [deleted] as many of our more survivable assets do not receive major production funds until the [deleted] timeframe.

Senator **Thurmond.** Dr. Latham, with our present systems do we have the capability to interdict the Soviet systems with our forces in a second strike?

Mr. **Latham.** The answer to this question is so highly dependent upon the nature of the Soviet attack and the point in time at which the National Command Authority (NCA) makes a decision to launch a counterattack, that there is no single nor simple answer. [Deleted].

Senator **Thurmond.** Mr. Latham, if the US were to adopt deep silo basing for the MX missile, how would we employ C^3 that could be assured to survive a Soviet first strike?

Mr. **Latham.** The principal difference in C^3 for deep basing of the MX and other deployment options is in implementation of survivable post-attack communications with the underground facilities. Specific engineering designs have not been prepared, but there are several options. These include use of [deleted] and combinations of such approaches. These communication links must collectively be as survivable and endurable as the weapon system itself.

CREDIBLE C^3I FOR CPA MX

Senator **Thurmond.** General Davis, there has been some public discussion about MX basing in continuous-patrol aircraft. The Soviets have made great strides in a wide array of high-technology weapons. If continuous-patrol aircraft is the selected MX basing mode, how will the US provide a credible C^{3}I in light of current and developing Soviet weaponry?

General **Davis**. Since the President announced his strategic modernization program, a major effort has been directed toward defining the best potential basing mode for MX. Currently, there is no funding available for study of the continuous patrol aircraft concept. Until the system is better defined, any attempt to describe the supporting C^{3}I would be based on conjecture.

Senator **Thurmond**. Mr. Latham, if the multiple shelter mode is selected for MX, the number of links of the C^3 chain will be greatly lengthened. How will the U.S. provide survivable C^3 for this type of system?

Answer. It's likely that a multi-tier C^3 concept would be used.

First, a peacetime fiber optic system will provide effective, two-way command and control between the missile shelters and the manned control centers. If the control centers are destroyed or if any shelters become disconnected from the fiber optic net, airborne launch control center aircraft will take control through a radio frequency link direct to each missile shelter.

If both of these control elements are lost, a third level of control would provide a slow but survivable very low frequency (VLF) radio frequency link between the missile and any remaining element of the National Military Command System.

Such a multi-tier method of control would follow definite hierarchy rules whose control is maintained by that level which provides the most positive control over the missile system.

SURVIVABLE C^{3}I VS. SURVIVABLE ICBM

Senator **Thurmond**. General Davis, as the Strategic Air Command's commander, is survivable C^{3}I as important to you as a surviving basing mode for your ICBM force?

General **Davis**. Senator Thurmond, when he announced his strategc modernization program, President Reagan directed that C^{3}I programs be accorded the same priority as the forces they support. I have repeatedly stated my agreement with that position. We are taking the steps necessary to solve our current problems.

C^3 FOR SURVIVABLE MX BASING

Senator **Thurmond**. General Davis, does the search for hardened C^3 impact upon the selection of an MX basing mode? In other words, given the assumption that all basing modes offer a degree of ICBM survivability, is it easier to select a basing mode to fit the most survivable C^3 system?

General **Davis**. A survivable C^3 system should not necessarily drive a decision on an MX basing mode but should be a criteria used in the evaluation process. It is imperative, however, for the C^3 system supporting the missile system not to be the weak link. The C^3 system should be at least as survivable and endurable as the supported weapon system. Those C^3 systems which are being developed and deployed to provide survivable and enduring capability will be integrated into the MX basing mode for assured connectivity.

Questions Submitted by Senator Carl Levin

Senator **Levin**. Dr. Latham, in your statement, you claimed that we are deploying the ELF system to strengthen pre-attack connectivity to the SLBM forces. We are already at 90 percent connectivity: How much extra connectivity are we buying for $231 million? Aren't there other more cost-effective systems for improving connectivity?

Mr. **Latham**. The 99 percent connectivity parameter applies to [deleted]. Additionally, it should be noted that the existing systems which provide the connectivity, force the submarines to limit their operational capabilities in terms of both speed and depth.

The ELF system will thus significantly increase: [deleted] and their ability to evade anti-submarine search operations.

ELF is the only near-term, cost-effective system available that will improve connectivity to our submarines. While many other alternative technologies to provide an undersea communication capability for submarine command and control have been examined, none has been found feasible for the near term.

ELF OPERATIONAL CAPABILITY

Senator **Levin**. Dr. Latham, while we are going into production on the ELF system now, we do not currently have an agreed upon strategy for operation of our SSBN's with this new communications tool and will not have until after extensive operational tests. Do we currently have a tested strategy for operating our SSBN's under ELF communication? Is it possible that the operating concepts would cause changes in the ELF hardware and technology implementation?

Mr. **Latham**. Under peacetime or limited conflict scenarios, the [deleted] capability from ELF is tactically useful. It will also enable us to maximize [deleted] special missions. ELF testing with the Clam Lake Facility and [deleted] SSBNs is in progress at this time. These Atlantic Fleet SSNBs are routinely patrolling with ELF R&D receivers and are providing valuable operational data. [Deleted] and several [deleted] are scheduled to receive ELF R&D receivers this year. The Clam Lake facility has been in an R&D receivers this year. The Clam Lake facility has been in an R&D status for 13 years with over 3 years of operation with both SSBNs and SSNs. With the data available from previous and current operations the new operational concept is being developed. A preliminary version is in use in the Atlantic Fleet and an improved version will be available next year. These improvements in operating concepts will not have any bearing on the ELF hardware or technology implementation.

STRATEGIC C^3

Senator **Levin**. Late last year, during its hearings on the President's strategic program decisions, the Subcommittee was given three IOCs for the ECX replacement for our TACAMO aircraft used to communicate with our missile submarines. You answered Senator Nunn for the record that there was a need for the ECX/TACAMO replacement aircraft to be "on-line in [deleted]": Other answers provided for the record gave the ECX IOC as both [deleted]. What explains these contradictory responses? What is the IOC of the ECX, how do you define it, and can it be accelerated through additional funding? Please provide an out-years funding profile to accelerate the ECX program as fast as possible.

Admiral **Nagler**. An element of contradition may have been introduced by the proliferation of so many numbers with regard to ECX timing as the program has developed. I would like to set the record straight by saying that there is a real need to be on-line with the first ECX aircraft [deleted]. This would be prior to the first period of block obsolescence in the EC-130 force, which will occur [deleted] when nine of the existing force will reach the end of extended service life. Due to the competition for scarce resources, and the budget review process, we were unable to commence the ECX program as early as we would have liked, and our first few aircraft will not be completed [deleted]. Initial Operational Capability (IOC) for ECX is and is timed to coincide with the [deleted]. IOC is defined as that time when sufficient aircraft are delivered so that the first ECX squadron is operational. Full Operational Capability (FOC) will be in [deleted].

There is potential for acceleration in the ECX schedule; however, the maximum gain we could expect to achieve is about 6-12 months with the potential for increased technical risk, and this is considered to be undesirable. Accelerating IOC and FOC by up to a year would require procurement of six aircraft in [deleted]. The cost associated with an increase in production of this magnitude is highly dependent upon the contractor's capacity, and cannot be accurately estimated until a contractor is selected and his ability to produce is known.

Senator **Levin**. Compare the endurance of the ECX with that of TACAMO, please.

Admiral **Nagler**. The unrefueled endurance for ECX is not specified in the Request for Quotations provided to industry on 11 March; however, criteria for aircraft engineering requires a capability to perform two profiles which will typify the TACAMO onstation mission of the future. These are: [deleted]. An aircraft that could perform those missions would be capable of satisfying the wide variety of operational profiles required of the TACAMO force. The RFQ does specify a refueled endurance of [deleted] Maximum endurance of the current TACAMO EC-130 is [deleted].

Senator **Levin**. What capabilities of the MILSTAR system will be used to improve two-way communications (with submarines)?

Admiral **Nagler**. The MILSTAR system will provide significant [deleted] capability improvements for two-day communications with our strategic submarines. These capabilities are achieved by operating at [deleted]. In addition, the submarine terminals will use [deleted]. In a war-time environment the connectivity to the submarine force is also enhanced by the improved survivability/endurance of the individual MILSTAR satellites and by the [deleted] the MILSTAR satellites.

SSBN COMMUNICATIONS

Senator LEVIN. Why can't the new buoy being adapted for improving communications with our attack submarines at higher speeds and greater depths be adapted for use with our missile submarines?

Wouldn't such an adaptation support the emphasis you told the committee last year you have placed on maximizing the commonality in the communications systems for both missile and attack submarines?

Admiral NAGLER. The Navy is continuing to strive for commonality wherever possible. In the case of submarine buoys we are planning to utilize a common hull form for both attack and missile submarines. There will be modification within the electronics of the buoys to meet the specific needs of each platform. Even in these cases, however, as much uniformity as possible will be included in the design and construction of the antenna systems.

SSBN SECURITY

Senator LEVIN. Do we have any evidence that the Soviets have been able to gather a sufficient enough data base on the operations and patrol areas of our missile submarines to permit them to target our missile submarine force at sea?

How can the Soviets gather such data, since the number of times our SSBNs have been detected by any nation—US, our allies, the Soviets—is almost infinitesimal compared with the number of days our missile submarines are on patrol each year?

Admiral NAGLER: The Soviets have developed [deleted]. To support ASW operations in the open ocean environment, Soviet ocean surveillance entitities such as [deleted].

The current overall capabilities of the [deleted]. It is apparent that the Soviets do not [deleted] but, in keeping with their [deleted] they attach importance to all [deleted] and emphasize the most [deleted].

Projected sensor systems to monitor submarine forces in the open ocean are based upon extensions of today's technologies and the projected advancement and logical development of future technologies.

Future development of the [deleted]. It is likely that [deleted] are continually improving, with a [deleted] and forwarding the resultant intelligence to the operational command structure. [Deleted]. Incremental improvements in Soviet sensor research could eventually provide some level of effectiveness against our current nuclear submarines. Our plans to counter this possible increased effectiveness include the deployment of the Trident submarine and the Trident missile. The longer range Trident missile will permit operation of our submarines in [deleted] the present patrol area size thus increasing Soviet search areas significantly. The Trident submarine incorporates significant quieting improvements and [deleted] to reduce detection and complicate search by advanced sensors. The larger Trident submarine also permits installation of advanced countermeasures equipment as potential threats become identified. Advances incorporated into the Trident weapons system will provide increased flexibility in the range of available patrol depths and speeds. [Deleted]. Our SSBN Security Program and the improvements in surivability we have put into our submarines and weapons systems are expected to provide sufficient and flexible response to future threats which might develop from Soviet research and provide for continued survivability of our SSBN force.

SOVIET C^{3}I ENDURABILITY

Senator LEVIN. General Davis, your statement presents time limits showing the endurance of our present and projected C^3 systems, in terms of minutes, days, months, et cetera, when attacked by the Soviet Union. If the United States were to dedicate some part of its strategic nuclear forces against the Soviet C^3 systems, please provide a time line, showing the Soviet system's endurance.

General DAVIS. National guidance, which is rataliatory in nature, directs the [deleted] as the first priority objective. In implementing this guidance, JSTPS attempts to target [deleted] Soviet procedures provide for [deleted]. We believe that about [deleted] we have identified and targeted will suffer at least [deleted] in our largest attack. Inasmuch as [deleted] are used in attacking these fixed sites, damage will be inflicted over a time period of approximately [deleted]. With regard [deleted].

SOVIET COMMAND CENTERS

Senator **Levin**. General Davis, Secretary Latham's briefing showed there are approximately [deleted] in the Soviet Union that we have located. If we decided to attack them, how many of these could we destroy, within what time periods and with what types of weapons?

General **Davis**. National guidance currently directs the [deleted] as the first priority objective. In implementing this guidance, JSTPS attempts to target [deleted]. We believe that about [deleted]. We have identified will suffer at least [deleted] in our [deleted] are used in attacking these sites, damage will be inflicted over a time period of approximately [deleted].

ELF COST EFFECTIVENESS

Senator **Levin**. Has the Navy compared the cost effectiveness of the ELF Program to that of other C^3 improvements which could also allow submarines to operate more flexibly than they can now? If so, how was the cost effectiveness of ELF and the other alternatives compared? Was a formal cost effectiveness study done? What were the results of this study? Please provide it for the record.

Admiral **Nagler**. No, the Navy assessment was based on different standards. The operational contribution of ELF to communications connectivity over currrent capabilities and system design changes which could attain this capability at minimum cost were the primary factors used to evaluate the contribution of ELF. This analysis is formally documented in the Navy Assessment Report on Stratetgic Connectivity provided to the OSD Strategic Review Committee. This committee approved its major finding that "an ELF Communications System of modest size can be beneficial to strategic connectivity" and expanded the scope of the system [deleted]. A copy of the report is attached. (The report is classified and retained in Armed Services Committee files.)

IMPACT ON NAVY'S C^3 DEFICIENCY

Senator **Levin**. Admiral, would you agree that the Navy's most important C^3 deficiency is the lack [deleted]. Since it is not survivable, how can Project ELF make a significant contribution to these capabilities.

Admiral **Nagler**. The Navy does have a [deleted]. It is the TACAMO [deleted]. Improvements to TACAMO, accomplished in coordination with upgrades planned for other systems and deployment of ELF, will greatly enhance achievement of our assured capability to communicate to the SSBN force when required .

The ELF system itself is not [deleted].

ELF OPERATIONAL CAPABILITY

Senator **Levin**. Admiral Nagler, it is our understanding that the proposed ELF system would require a new operational concept for SSBN's and that sub commanders will not agree to an ELF operational concept until after extensive operational testing has been completed. Since ELF full operating capability is not expected until [deleted] why no delay the installation of a full system, continue ELF testing with the Clam Lake facility and compare ELF to alternative communications schemes in several years. Why build the hardware now when the Navy is just at the beginning of concept testing and development? Isn't this just another case of rushing into production before all systems performance characteristics are evaluated? Aren't we running a risk of having to revise the ELF hardware after we have decided on the operational concept? Won't this implementation strategy lead to cost overruns?

Admiral **Nagler**. The ELF system provides for changes in the operational concept for our SSBNs which will enhance their flexibility and expand their current operational envelope. The submarine force commanders strongly support the ELF program. ELF testing with the Clam Lake facility and [deleted] SSBNs is in progress at this time. These [deleted] SSBNs are routinely patrolling with ELF R&D receivers and are providing valuable operational data. [Deleted] several [deleted] are scheduled to receive ELF R&D receivers this year. The Clam Lake facility has been in an R&D status for 13 years with over 3 years of operation with both SSBNs and SSNs. With the data available from previous and current operations the new operational concept is being developed. A preliminary version is in use in the Atlantic Fleet and an improved version will be available next year. Delaying the Full Operational Capability (FOC) for several years beyond the current [deleted] date will serve no useful purpose and only result in greater expense. Production model equipment will have all system performance characteristics necessary. We are not rushing into production. It is an orderly process based on years of testing.

Senator LEVIN. The Defense Department is placing a very high priority on building C^3 systems which are survivable in a nuclear attack and capable of remaining so for long periods of time. For ELF to have such capabilities, the Navy would have to greatly expand its size and "hardness" against attack. What plans does the Navy have to expand the presently proposed, 84-mile ELF system in Michigan and Wisconsin to reflect this high DOD priority?

Admiral NAGLER. The Navy has no plan to expand the 84-mile ELF system in Michigan and Wisconsin nor to make it physically harder against direct nuclear attack. The ELF System approved by the President and Congress includes features which will ensure reliable performance against jamming, have independent auxiliary power, and have electromagnetic pulse protection.

Senator LEVIN. A major criticism against ELF is that its message transmission capabilities—i.e., data rate—is too slow to be useful to help meet the Navy's most important strategic need—dissemination of [deleted] orders to missile submarines by way of a survivable C^3 system. In order for ELF to meet that need, its antenna length and transmitter power capabilities would have to be significantly expanded. What plans does the Navy have to expand the proposed system to meet this Navy need?

Admiral NAGLER. The Navy has no plans to expand the proposed 84-mile antenna ELF system located in Michigan and Wisconsin. It is not intended to use ELF to disseminate [deleted] orders to missile submarines. The ELF system will add a new dimension of capability and expand the operational envelope of command and control connectivity to our submarines. Its inland location, [deleted] will enable it to reliably function several minutes longer than any of our fixed systems under attack and deliver important alerting messages. This "heads up" will enable our submarines to adjust their operational posture [deleted]. Analysis of the communications traffic sent to our submarines today shows that the data rate and message capacity of the current system, when employed in coordination with a higher data satellite or VLF system, can manage a force level of [deleted] submarines at sea and limit their excursions to periscope depth.

Senator LEVIN. What is the five-year funding profile for development of a Submarine Laser Communications System (SLC)? Please provide a breakout showing funding for both the Defense Advanced Research Projects Agency (DARPA) and the Navy for this program.

Mr. LATHAM. The following funds have been identified for SLC:

[In then-years millions of dollars]

	Fiscal year—				
	1983	1984	1985	1986	1987
DARPA SLC	31.2	40.5	57.6	75.3	85.0
Navy (various PE's)	3.2	3.0	3.0	TBD	TBD

Senator LEVIN. What are the major milestones in the program under the current funding profile?

Mr. LATHAM. Current budgets for SLC support airborne tactical submarine laser communications tests and at-sea exercises in fiscal years 1984 and 1985, followed by transfer to the Navy. By the end of fiscal year 1984, the technology for satellite-based SLC systems will have been pursued sufficiently to understand the feasibility of laser satellite or mirror-relay versions and to permit a decision on which to pursue in further development—if anything.

Senator LEVIN. For the past two years, Congress has authorized and appropriated additional funds for the SLC program to accelerate it. Late last year, when the Administration recommended cuts in the defense budget, the SLC program was one of only two programs in which DoD recommended an increase above its original fiscal year 1982 submission. This approved acceleration of the SLC program in fiscal year 1982 could be taken as a measurement of DoD's recognition of the high potential payoffs for this program in terms of improving communications to both missile and attack submarines, couldn't it?

Mr. LATHAM. Yes. the Department of Defense recognizes a potential payoff for the SLC and supports the SLC technology program.

Senator **Levin**. A good way to evaluate risk is to look at past performance and milestones. How well is the blue-green program doing in meeting its technical milestones? What recent progress has been made?

Mr. **Latham**. The Submarine Laser Communication Program has met or bettered all of its technical milestones to date. These milestones have covered the entire range of SLC technologies including space blue-green lasers, ground lasers, atmospheric compensation, receivers, and actual communications performance in an aircraft-to-submarine communications experiment. Recently a mercury bromide laser has demonstrated 10 million shots on a single fill, a significant milestone. Laboratory atmospheric compensation experiments have been completed with the Lincoln Laboratory 70-channel system and the equipment has been shipped to the ARPA Optical Station on Maui for low-power atmospheric tests. While basic physical feasibility of an airborne SLC has been demonstrated and this is the focus of near term developments and goals, much technology development remains before the feasibility of satellite systems can be established.

Senator **Levin**. What parts of the blue-green concept are the riskiest? What is the program doing to reduce those risks? Could more be done now to make an eventual system less risky?

Mr. **Latham**. Both the laser satellite and mirror relay approach have considerable risk. This is why we have decided to proceed with an aircraft experiment before we make any decisions on a satellite approach. For the laser satellite, the highest risk element is the blue-green space laser itself. Achieving required efficiencies and lifetimes is very difficult. The current program is examining a variety of blue-green lasers in the laboratory and will take one of them to a 200 watt laboratory breadboard device for evaluation.

For the mirror satellite approach, there are many risk elements: such as wavefront sensors, shared aperture components, coatings, beam path conditioning, and 1000-channel adaptive mirrors for the ground station. Of these, the 1000 channel mirror technology is being developed and the rest will be developed after the 1984 decision. The ground laser itself is the greatest risk for the mirror satellite approach. Critical areas are beam quality and run time. The laser is being developed under the short wavelength laser program and will reach a preliminary design with a limited set of verification experiments in early fiscal year 1985. In addition, development of lightweight focusable mirror segments, driver actuators, and backup structures are of some risk. Risks can always be reduced through more early tests and investment, but the current program is believed to be a good balance between risk and prudent investment.

Senator **Levin**. How well did the 1981 communications experiment do? What did we learn from it? What can we now predict with confidence, and what are the uncertainties?

Mr. **Latham**. This experiment was designed to validate models of how well blue-green laser light can communicate through clouds and water to submarines. It met predicted performance levels by communicating to over [deleted].

The experiment used a 1 watt laser at 40,000 feet illuminating a 3–6 km diameter spot. Clouds were 800–1600 feet thick, and water clarity was typical of that found in actual submarine operating areas. We can now predict depth performance under a wide range of conditions within [deleted]. Remaining uncertainties have to do with global statistics and with development of the equipment itself. There are no physical feasibility issues.

Senator **Levin**. This experiment might be a good measure of risk. Did the program meet its milestones here? How long did it take?

Mr. **Latham**. This experiment was originally planned for fiscal year 1983 or 84. In July 1980, the decision was made to conduct the experiment in April and May 1981, 9 months later. It met all objectives and was conducted on time.

Senator **Levin**. Is the technology available now to improve performance significantly? Why aren't you taking advantage of it?

Mr. **Latham**. Technology does exist and we are taking advantage of it. We believe that a [deleted] improvement in laser power compatible with aircraft and a [deleted] performance gain in the receiver is possible. Efforts are under contract to obtain fieldable transmitter and receiver systems for lab test in late fiscal year [deleted] and at-sea experiments starting in fiscal year [deleted] Performance improvement should allow communications from an aircraft to a submarine submerged to over [deleted] at noon through heavy clouds and dirty oceanic water.

Senator **Levin**. This experiment was criticized as not being sufficiently rigorous to demonstrate how the SLC system would operate in normal submarine patrol conditions. Critics state the test was done in low light periods to enhance the laser receiver's ability to receive the signal and was done while the submarine was moving at low speeds.

It is not true that many optical tests have been done in full daylight, and that increasing the laser's capabilities for effective daylight reception presents no technical problem?

Mr. **Latham**. Night runs were elected because first generation equipment was severly limited in performance. However, since the objective of the 1981 tests was to validate our performance prediction capability, this was of no consequence. Moreover, a few runs were conducted shortly [deleted].

SUBMARINE LASER COMMUNICATIONS

Senator **Levin**. Is is not true that sufficient evidence exists to indicate that the laser can be received at even the highest submarine operating speeds? Please provide such data.

Mr. **Latham**. Conceptually, there will be no restrictions on submarine speed when receiving SLC laser signals. Higher operating speeds will generate two effects which could degrade system performance: (1) bioluminescence, and (2) turbulence around the submarine. Tests to date showed that interference caused by bioluminescence is small compared to background noise caused during daytime by sunlight. The observed bioluminescence is extensive and is not expected to increase with speed. Similarly, turbulence around the submarine at any speed is not expected to introduce conditions worse than surface disturbance caused by high sea states which was not found to effect reception adversely. In the current operational concepts, the illumination area is adjusted to the quality of the sea water, illuminating a smaller area where water is less clear in order to keep received light intensity constant. High speed could become a factor if achievable laser powers would require illumination areas small compared to distances traveled during the laser scan time. While current system designs do not foresee this problem, the concept does depend on the successful development of the required laser system.

Senator **Levin**. It has been reported that some recent Navy information has become available which alleges that operation of the SLC system would enable the Soviets to detect the location of our missile submarines. Is it not true that, from the very beginning the SLC system has been designed to operate without disclosing the location of submarines receiving its signals? Please describe how the system would operate to maintain the secrecy of submarine locations.

Mr. **Latham**. The SLC system will be designed so as to protect the invulnerability of the submarines it supports. Should technical development fall short in meeting this capability, its implementation would be unacceptable. A specific determination in attaining technical development to provide a reliable laser source and optical scanning system which will not spotlight the submarine's location cannot be made at this time. Many factors do exist which reduce or eliminate the probability of the system's use by others to locate or detect the submarine. These include: fundamentally, it is a one-way down link communications system requiring no active transmission from the submarine; the submarine will not be connected to the near-surface sea water envelope with any physical antenna device; refractive scanner light from laser illumination of the submarine will be absorbed prior to returning to the surface where it might be detectable by an optical search receiver, and at operating depths any small reflections from the submarine will be diffused within meters and be undetectable at the surface. If required, the system could be designed to be beamed to one spot in the ocean for lengthy transmissions of extremely important messages. Under this situation, the steady beam could alert a searcher to the position of the submarine in the geographic area of the [deleted]. This method or procedure would only be used at the discretion of the submarine operating authority when the importance of the communication requirement overshadows the risk of detection or localization.

Senator **Levin**. A report that a helicopter pilot was injured accidentally when someone experimenting with a "backyard" laser fired it skyward has raised a question whether the SLC system poses such a problem. I understand it does not and that the SLC was designed to prevent this. Could you elaborate on this for the record?

Mr. **Latham**. Blue green laser light can injure eyes under certain circumstances. The SLC concepts are specifically designed to preclude those circumstances and prevent eye hazard. For airborne SLC the light beam spreads very rapidly from the aircraft so that by the time the aircraft is more than a few hundred feet above an observer, he sees much less light than the safety standards allow. This is not the typical laser pencil beam such as used in the "backyard" experiment. At night the downcoming beam from either satellite or aircraft would appear no brighter than a star, and would constitute no more hazard.

The uplink beam for the mirror satellite would be a hazard within the very narrow (1–2 meters) confines of the beam as it goes up through the atmosphere. Radar interlocks and a small controlled air space have been used in other experimental laser installations and would reduce hazards of operation. The accident described resulted from the lack of such attention to safety.

Senator LEVIN. What are the vulnerabilities of both SLC satellite systems compared to our current and planned submarine communications systems? Compared to other space systems, such as MILSTAR and GPS? Can something be done to increase survivability?

Mr. LATHAM. A laser satellite system would likely have survivability comparable with other high altitude space systems. Though use of mobile ground or air uplink RF terminals, high altitude orbits, a reasonable degree of hardening, and possibly some maneuver capability, SLC has the potential for good survivability. The mirror satellite system approach is much more vulnerable if the uplink laser is deployed at a fixed ground station. If the laser transmitter could be deployed on an aircraft or some other mobile platform this vulnerability could be reduced, but a mobile laser transmitter is technically risky.

The survivability of any space assets must be viewed as a systems problem. Under conditions of Soviet direct attack on our satellites we would likely be taking appropriate actions to deny or degrade such attacks though for example, [deleted] and other means. Therefore, the survivability of space systems is very scenario dependent and thus difficult to quantify precisely. We do believe that systems at synchronous altitudes can be made quite survivable as can multiple orbit, hardened systems like GPS.

Senator LEVIN. What is the vulnerable element of a mirror SLC system? Can the laser ground system be made ground or air mobile? What should we do to find out? If it were on air base uplink would it be any less survivable than a laser satellite radio uplink terminal?

Mr. LATHAM. The most vulnerable element of the mirror satellite system is the ground station. An airborne laser uplink would be no more vulnerable than an airborne radio uplink, but could cost considerably more. Some sort of airborne uplink could be built (the Air Force's Airborne Laser Laboratory is an example) but the question to be asked is how much capability can be gained as a function of cost and fraction of the aircraft dedicated. Studies are required to quantify this and are being started. In the future, additional technology work beyond that required for an experimental ground system might be required.

Senator LEVIN. What options exist to reduce the vulnerabilities of the SLC system?

Mr. LATHAM. What is needed most is redundancy and mobility in the ground station for both the mirror satellite or laser satellite approaches. Very high altitude (5 x synch) orbits can be used, as could hidden reserve spacecraft stored on orbit, maneuver capability, stealth and signature reduction. Hardening of the satellites is also important.

Senator LEVIN. What are the life cycle costs of such a system and how might they compare with those of other space systems. How many satellites are required to do the job?

Mr. LATHAM. Firm life cycle costs are unknown at this time and depend on the concept which would finally be chosen. Of the two approaches pursued, the space laser system and the ground based laser system, the latter would be expected to be considerably more expensive since as up to five ground systems might be required to provide required connectivity which is affected by local cloud cover. In order to adequately cover the ocean areas, four satellites are required regardless of the concept chosen. The uplink ground stations for the satellite laser system is a relatively simple RF system, the ground based laser system uplink requires a large high power laser system. The satellite system costs are expected to be comparable to other space systems. Comparing the costs of the two system approaches, it is expected that the space segments will be of comparable cost while the ground systems for the ground laser would be considerably more expensive than the RF system for the space laser system. An engineering study to define operating modes, required support and maintenance of the ground laser systems needs to be concluded before specific costs can be defined.

Senator LEVIN. If we don't know in detail what the costs are now, what do we need to do to find out? When would we know?

Mr. LATHAM. Life cycle costs are unknown but should be consistent with other space systems requiring 2 to 4 relatively large synchronous altitude satellites. More specifics will require completion of some of the technology development, an approach selected, and detailed engineering studies then completed. I expect it will be 1985 or later before believable costs are available.

Senator LEVIN. Are there any technology options for doing blue-green laser communications from space which should be developed to reduce eventual life-cycle costs?

Mr. LATHAM. We are pursuing the necessary relevant technology to determine feasibility and in so doing, will gain a better understanding of the elements of cost. Once basic feasibility can be established, the options to reduce costs will be more apparent.

Senator LEVIN. Are there any other tactical or strategic applications underwater or not, which might share the cost? What is the Navy doing to identify those missions?

Mr. LATHAM. A wide variety of potential missions for SLC have been identified but not examined in any detail. These include jam free links to low altitude SAC bombers and control of minefields, acoustic systems, underwater RPV's, and a host of other underwater assets. Submarine missions include real-time tactical threat and target date transmission. The Navy is supporting DARPA in examining some of these potential missions.

Senator LEVIN. Outline what other options you are pursuing to provide survivable communications with data rates high enough to send emergency action messages to submarines at depth in order to ensure the deterrence of our SSBN Fleet remains effective?

Mr. LATHAM. The requirement for survivable communications with data rates high enough to send emergency action messages to submarines at depth will vary with the scenario of the conflict envisioned and the anti-submarine warfare threat. In the pre-attack and early phases of the nuclear conflict, this capability will be provided by the highly survivable Airborne VLF Relay System (TACAMO). It is the primary Navy interface link with the submarine forces to transmit these messages. Replacement of the existing EC–130 TACAMO airframe with ECX will strengthen the survivability and capability of this system during this phase of conflict. The situation is signficantly different in the post-attack period when the ASW threat is expected to decrease. In this scenario, the capabilities of communications systems to be reconstituted or survive becomes important. The Navy is examining a range of concepts and options to improve the survivability and endurance of command and control in this time period under an active research and development program. Concepts being investigated include: a mobile van transportable ELF capability, erectable VLF capability, free floating VLF relay balloon, and acoustic relay concepts. The objectives is to provide a range of systems and capabilities for use which would best meet the existing tactical situation in this uncertain period of conflict.

Senator LEVIN. What could we do now to accelerate the SLC Program? Failing that, how can we insure that the opportunity does not slip even further than it has?

Mr. LATHAM. This, as is the case in most programs, could be accelerated by introducing greater concurrency. We have chosen to focus the efforts on the nearer term airborne systems which I believe has been demonstrated to be feasible and which can offer significant new tactical capabilities. The technology of satellite systems is being pursued to address the basic issues of feasibility. Given the technical uncertainties and concomitant need to resolve the critical issues related to feasibility, I believe the resources planned represent a proper investment to assure the most rapid development without undue risk or waste associated with high concurrency.

Senator LEVIN. Mr. Latham, please provide a five-year funding profile to accelerate the SLC program as fast as possible, and describe how this could be accomplished, and how major milestones would change.

Mr. LATHAM. As stated in the previous answer, we are pursuing the most reasonably balanced program considering the technical uncertainties inherent in the SLC Program. To further accelerate this program would entail unusually high concurrency, undue risk and consumption of critically required resources.

Senator WARNER. The subcommittee is adjourned.

[Whereupon, at 11:12 a.m., the subcommittee was adjourned, subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

MONDAY, MARCH 15, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES.
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

U.S. CHEMICAL DETERRENT

The subcommittee met, in executive session, pursuant to notice, at 10:40 a.m., in room S-407, the Capitol, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Hart, Exon, Pryor.

Staff present: Frank J. Gaffney, professional staff member; Paul C. Besozzi, minority counsel; George K. Johnson, Jr., Patrick L. Renehan, James C. Smith, professional staff members; Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner.

Senator WARNER. Secretary Perle, we are ready. Your statement has no classification; is that correct.

Mr. PERLE. That is correct.

Senator WARNER. This session is still a classified session.

STATEMENT OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE, INTERNATIONAL SECURITY POLICY, ACCOMPANIED BY DR. RICHARD L. WAGNER, ASSISTANT SECRETARY OF DEFENSE (ATOMIC ENERGY)

Mr. PERLE. Mr. Chairman, I want to thank you for this opportunity to appear before the subcommittee in support of the administration's program to deter the use of chemical warfare. I think it is crucial to give this increasingly emotional subject—chemical weapons and chemical warfare—the kind of dispassionate attention that the issue deserves.

Chemical weapons modernization has been, as you are very much aware, the subject of a great deal of criticism in the past. While constructive criticism has a proper place, it should be welcomed, I think, that some of the past criticism has emerged from misunderstanding of the purpose and objectives underlying our proposals for modernizing our chemical warfare posture and capability and I am hopeful these hearings will help correct some of those misunderstandings.

Let me start by emphasizing that chemical warfare modernization, as we view it, is not an end in itself. It is in fact a part of a larger effort by the administration to prevent any further deterioration of our overall military posture. What we are seeking is the best assurance we can achieve that chemical weapons will never be used against the United States or its allies. This is a point I want to stress at the outset before we look more deeply at the details of our proposed program.

The administration's ultimate goal in the area of chemical warfare is a complete and verifiable ban on the development, production and stockpiling of chemical weapons. I believe that our best hope at this time and under present circumstances of avoiding the likelihood of chemical use against us and our allies lies in our efforts to seek a ban through multilateral discussions and negotiations in the Committee on Disarmament.

We must recognize that such a multilateral effort to ban chemical weapons will take time, probably a number of years, and until such a ban can be obtained our objective, consistent with existing treaties and international law, will be to deter the use of chemical weapons by possessing a credible capability. In this intervening period it is essential that the United States acquire some sensible level of insurance against chemical weapons use through the modernization programs we are now proposing and which we will be discussing further this morning.

The administration believes that we need a persuasive prod, if you will, to get the Soviets to negotiate seriously about chemical weapons verification and compliance. Given the advantage they now possess in the chemical weapons area, it is unlikely that we will move them in that direction without an effort of our own.

We believe that we have a chance to move the Soviets from their current position by creating an incentive to them to achieve a ban. Indeed we are convinced that our weak chemical warfare posture, compared with that of the Soviet Union, has done little to encourage serious negotiations on their part. Instead, it has led them to conclude, and their behavior reflects this, that they can maintain an asymmetry in chemical warfare capabilities in the context of prolonged negotiations.

This is in part because the United States unilaterally exercised restraints by deferring chemical warfare modernization in the past. We must remove a Soviet interest in negotiations simply to impede an improvement in U.S. deterrent capabilities and provide an incentive to achieve the objective which prompts us to negotiate in the first place.

CHEMICAL AND BIOLOGICAL WARFARE TREATIES

As you are aware, the United States is a party to two treaties which impact chemical and biological warfare. The first is the Geneva Protocol of 1925 which prohibits the use in war of asphyxiating, poisonous, or other gases, and of bacteriological methods of warfare. This is generally viewed as a no first use agreement since a number of countries, including the United States, have entered reservations to the protocol allowing chemical use under specified conditions.

In our case, we have reserved the right to retaliate with chemical weapons against any enemy state whose armed forces or allies do not observe the provisions of the protocol.

The second treaty is the Bacteriological and Toxin Weapons Convention which prohibits the development, production, and stockpiling of biological or toxin weapons. Toxins are prohibited regardless of their origin or method of manufacture.

Senator **Warner**. What are the dates of that convention?

Mr. **Gold**. It was signed in 1972 and went into force in 1975.

Mr. **Perle**. I might say in passing about that convention, Senator, that we were well aware at the time that compliance with it was unverifiable. The decision was nevertheless made to proceed to conclude that convention, despite that fact.

Consistent with these treaties, the United States will not use chemical weapons unless they are first used against us or our allies. The United States does not and will not under any circumstances acquire or use biological or toxin weapons.

Senator **Warner**. For the record, the Soviets are parties to the 1925 treaty.

Mr. **Perle**. Yes; and they are also parties to the 1972 convention.

Senator **Warner**. Go ahead.

Mr. **Perle**. During the preceding decade, the United States demonstrated restraint and a willingness to obtain a complete, verifiable chemical weapons ban by refraining from producing and filling lethal or incapacitating chemical weapons. In 1969 the United States unilaterally renounced biological and toxin warfare. This was some time before the Biological Weapons Convention was negotiated.

While unilaterally restraining our chemical capabilities, the United States made major efforts in the late 1970's to eliminate the chemical threat by attempting to reach agreement with the Soviets on a comprehensive and verifiable ban on chemical weapons. Verification of such a ban is a complex and difficult problem, as I think the discussion earlier this morning had indicated.

Senator **Warner**. Is there a formal name for that series of negotiations?

Mr. **Boring**. We simply call them the bilaterial negotiations.

BILATERIAL NEGOTIATIONS BETWEEN U.S.-U.S.S.R.

Mr. **Perle**. They were conducted between the United States and the Soviet Union alone.

Senator **Warner**. Biological and chemical or just on chemical?

Mr. **Perle**. Just on chemical.

Senator **Warner**. They started in what year?

Mr. **Perle**. I think they started in 1977 and some dozen or so sessions were held between 1977 and the summer of 1980.

Senator **Warner**. Summer of 1977 and went through 1980?

General **Fulwyler**. There were some preparatory discussions for 2 years prior to 1977. The negotiations formally started in 1977.

Senator **Warner**. Was there a reason to leave out the biological?

Mr. **Perle**. They had already been covered under the prior convention, so while there is much to be said for——

Senator **Warner**. You mean under the 1972 convention?

Mr. **Perle**. That is correct.

I think there is something to be said for strengthening the verification provisions of the Biological Weapons Convention since it has none or none that would give us any reason for confidence.

Senator **Warner**. Was this effort in 1977 to try and get an agreement which covered chemical weapons in parallel terms with the 1972 biological weapons agreement?

Mr. **Perle**. I think we have hoped in the chemical weapons negotiations that we could go beyond what was done with respect to biological weapons, particularly in the area of verification of compliance. We have believed and continue to believe that a chemical weapons agreement must be verifiable.

DIFFERENCE BETWEEN BIOLOGICAL AND CHEMICAL

Senator **Warner**. Just a general question. Can that line be drawn with such precision between biological and chemical, or is there an overlap in some of these systems?

Mr. **Perle**. I believe it is difficult to draw that line and there was some considerable discussion after the appearance of mycotoxins in Southeast Asia as to whether the agents that were being used were biological in nature or chemical in nature. The distinction is a technical one and there was some prolonged period of uncertainty.

I believe we have now concluded that those toxins are biological in nature but if there is someone with a better view, I would be glad to——

Senator **Warner**. Let's open up that question to the rest of the witnesses.

Mr. **Gaspari**. Mr. Chairman, the use of—well, you heard the use of biological toxins or toxins per se is covered in the Biological Weapons Convention.

A toxin is in itself a chemical poison that can literally be called a lethal chemical war agent or a chemical warfare agent. But it happens to be covered in a biological convention. So there is a kind of a gray area here, as Mr. Perle has said, about these toxins. They were thrown in as an afterthought, actually, but then you introduce more technical problems if you come to the point that you are going to be able to synthesize a toxin without having a biological source.

General **Fulwyler**. Mr. Chairman, I have a doctor here.

General **Rapmund**. Mr. Chairman, the mycotoxin is of biological origin and is extracted from certain kinds of fungus from the Fusarium species, so it would clearly be a biological toxin. The toxic material may be very precisely chemically defined, but it is of a biological origin, without question.

Mr. **Perle**. I think the determining factor, Senator, is the origin. If one can synthesize chemically without going through biological development a weapon that had the same effect as the mycotoxin or that contained the active chemical ingredient, then it would fall on the other side and be chemical rather than biological. We are unlikely to be able to determine in every case the precise origin. However, the Biological Weapons Convention covers biological toxins regardless or origin or method of production.

Senator WARNER. OK, if you will continue with your statement.

Mr. PERLE. With respect to the negotiations, that effort became stalemated principally due to fundamental disagreement on the essential issue of the need for effective verification of a chemical weapons ban and particularly as a consequence of Soviet intransigence on questions relating to on-site inspection.

I think, if I may say so, the discussion we had this morning [deleted] underlines the importance of access to facilities of this nature if we are to be able precisely to establish what in fact is going on.

We failed to get much Soviet cooperation on the verification issue and we believe that a treaty with inadequate verification provisions is unacceptable to the United States.

Negotiations were further complicated, I believe——

Senator WARNER. On that point, that is a clear point on CW, but we seem to have accepted it in biological.

Mr. PERLE. That is correct. A deliberate decision was made to enter into the Biological Convention despite our knowledge at the time that it would not be verifiable. I believe this resulted, in part, from a lack of any desire on our part to develop biological weapons and the judgment that was made at the time that since we have no intention of doing so, there was little to lose by entering into a convention.

My own view is that it is never wise to depart from the principle of adequate verification. It is something upon which we ought to insist in our negotiating context. I think it is fair to say that our position in the negotiations was complicated by the fact that our own chemical warfare posture compared with the Soviets was weak. There is a large asymmetry in chemical warfare capabilities.

SOVIETS WILLING TO NEGOTIATE

The Soviets were quite willing to negotiate. Indeed, they are often quite willing to negotiate even though they were unwilling to agree to verification provisions, not least of all because I think they judge that in the absence of negotiations the case for modernization of U.S. chemical weapons would be greatly enhanced. They have found in this, as in other negotiations, that the mere fact of negotiations can tend to diminish interest in modernization on our side, so I think they found the negotiations convenient.

In any case, we have been forced reluctantly to conclude in the absence of significant progress in these negotiations that the only way we can provide for safety of our forces in warfare in light of the chemical threat of the Soviet Union is by maintaining an adequate capability to deter by maintaining an ability to respond in kind, if necessary.

Senator HART. Excuse me, Mr. Secretary. Are those one and the same thing?

Mr. PERLE. One can imagine, Senator, other ways of deterring the use of chemical weapons.

Senator HART. For example, by making them ineffective? That is to say by defending against them?

Mr. PERLE. Yes. But only if we had a perfect defense against chemical weapons that would be a way of rendering the use ineffective against our own forces. However, defensive measures are far from perfect because they severely degrade unit effectiveness.

Senator **Warner**. Senator Pryor, we are pleased to welcome you to this meeting.

Dr. **Wagner**. Senator, we recognize that is a fundamental point in the program we are going to lay out and we will develop a good bit more about that distinction as we go on.

Senator **Hart**. Well, I wanted to make the point about the connection. The Secretary used the "by." There is another way to look at the problem.

Mr. **Perle**. I think the meaning is to do what we can to protect our forces and decrease, if we can, the military utility of these weapons if employed by the Soviet side, and to maintain the capability to respond in kind if necessary. We do not see chemical weapons as a desirable mode of fighting wars.

Let me take a moment to address some of the broader considerations which have been raised concerning our chemical weapons program proposals and their implications for the Alliance. We have kept our allies informed about our thinking on these matters, about our program, and they are well aware of our intent to modernize our chemical retaliatory capabilities. We have made clear, however, and our allies fully understand our position, that this decision is the United States decision to make alone, as we are the only country in the NATO Alliance that has a stockpile of chemical weapons.

We therefore believed it would be inappropriate to ask the allies to share the responsibility for this decision and thus we have not done so. I might add that we were not anxious to repeat the mistake that was made in 1977 when we invited our allies to participate to a degree that exceeded their desire in the decision to deploy neutron weapons. We found ourselves and they found themselves embroiled in an unnecessary controversy.

DEVELOPMENT AND PRODUCTION OF CHEMICAL WEAPONS

At present, our decisions involve development and production only, and that is the program before the Congress. Of course allied views on the subject of deployment will be an important consideration when and if deployment should ever be necessary or desirable.

Senator **Hart**. Excuse me, Mr. Secretary. This seems to be a fundamental point. I heard what you just said and that was "when and if" we decided to deploy would be the time to consult with the allies. Is that it?

Mr. **Perle**. That is correct.

Senator **Hart**. What if there is shooting going on and bombs going off? What kind of consultation do you think there will then be?

Mr. **Perle**. I think it would be a good deal more fruitful than some of the consultation that we have well in advance, Senator. I think as a practical matter much of the political inhibition on difficult decisions of this kind could be expected to diminish in the context of a war.

Senator HART. So the whole idea, then, is to produce and not deploy, wait for the conflict to begin, and then in effect finesse the whole diplomatic problem by just saying, "here they come".

Mr. PERLE. No; I think that gets a little ahead of where we are because no decision has been made.

Senator HART. I'm sorry, could you repeat that?

Mr. PERLE. No decision has been made on what sort of deployment we would find useful or desirable. It may well be that some judgment will be made in peacetime and hopefully we will succeed in deterring a war for a good, long time. Long before that we will make some judgment as to whether a deployment is necessary.

Senator HART. But, in other words, the plan of the administration is to produce and then to try to resolve the issue of deployment.

Mr. PERLE. That is correct.

Senator HART. Why is that?

Mr. PERLE. Well, for one thing, this is not a particularly benign political environment to suggest the deployment of chemical weapons in Europe in particular and I would be less than candid if I said that was not an important consideration.

As you know, we face a similar situation with respect to enhanced radiation weapons. I believe very strongly that we have to continue work for a more favorable political environment in Europe and if we refrain from development and production of necessary weapons now because the climate now is a difficult one politically, then we will not be in a position if the climate changes to take advantage of that situation and together with our allies make some difficult deployment decisions.

Senator HART. Leaving aside the question of the political climate and the difficulties thereof, what is the senior military judgement with regard to the efficacy of deterrence by a new generation of chemical munitions stored in this country?

Mr. PERLE. Are you asking whether we believe that if the weapons were stored wholly within the United States they would be militarily effective in deterring the Soviet Union?

Senator HART. Yes, what is the military judgment on that?

Mr. PERLE. I would defer to my military colleagues, but obviously, unlike enhanced radiation weapons which are relatively few in number and can be quickly transported, we are talking, with respect to chemical weapons about a rather large quantity that would constitute a major strain on our ability to deliver weapons to the theater in a timely fashion.

Others may wish to add to that, but clearly it would be better from the deterrent point of view to have weapons in the theater rather than out.

Senator WARNER. Let me interject a question and then I think we have to press the military for a response to Senator Hart's question.

I am an old military man myself and I am a firm believer in how it worked in World War II. We had it, they had it, nobody fired it. As we turn to our military people for response, is there a possible scenario of the Soviets knowing that we have it and the others do not and they might not use it against our people and they might use it against other sectors on the NATO front?

Is that not a reason that we could give for at least the initial steps of the President's program? Let's have a response to Senator's Hart's special question and then my observation.

MODERNIZED BINARY STOCKPILE

General **Burke**. My opinion would be a modernized binary stockpile system of the type under discussion would produce a deterrent at least an order of magnitude greater than the very limited capability force that we now have. It would be even greater than that by some percentage it it were forward-deployed in Europe. But I think it is a much bigger step to go to a modern capability than it is to move it over there, with NATO only 10 to 12 hours from delivery by air transportation.

Senator **Hart**. In a hostile environment would most of these munitions be transported by air or by sea?

General **Burke**. Under the scenario which you were imagining, I think it would clearly be by air.

Senator **Hart**. That would compete with movement of personnel.

General **Burke**. I would think it would be the matter of highest priority and we would take it into the bases not too proximate to the front and then we would deliver them on tactical airplanes.

Senator **Hart**. Understanding it is difficult, if not impossible, to accurately quantify these things. How much greater deterrent would it be to have it in Europe than to have it in here?

General **Burke**. I would say it is perhaps a factor of 10 to go from where we are now to where we propose to go. It is another 50 percent to go from United States-based to European-based.

Senator **Warner**. You better add on here your observation about the fact that even with the current stockpile, we have got to redeploy the vast majority of the United States' chemical munitions weapons, don't we, under attack? So there is a parallel scenario which we have with the binary of getting it over there to where we are today and either replenishing what we might exhaust in the opening phases and then augmenting. It that not correct?

General **Burke**. Of course, there are real problems of getting what we have over there today.

Senator **Warner**. So we have the same problems of getting it over there whether we go into a binary production or just adjusting where we are.

General **Burke**. We have a bigger problem where we are because it is much more dangerious.

Senator **Warner**. Much more dangerous.

Mr. **Perle**. Well, let's have the comments of the other military representatives.

DEPLOYING WEAPONS TO EUROPE

General **Fulwyler**. Well, first of all, Senator Hart, deterrence would be much more enhanced if the munitions were in Europe. There is no question about that. But I think you must remember that as crisis management starts or as indications of conflict grow larger, then I think we would not wait until conflict actually started before we started deploying various weapons to Europe, chemicals being one of them.

Based on my experience in Europe I do not believe that we woud have the problem, the critical problem of deploying these munitions to Europe if we were involved in crisis management which looked like it was going to end up in live combat or conflict. I think the munitions, if we have them already prepared and produced in this country, we could start moving them to Europe much earlier and certainly we would want to do that before conflict started.

Senator HART. What quantity of munitions would constitute a credible deterrent in Europe?

General FULWYLER. That is a difficult question and difficult to quantify. I think that a reasonable deterrent would be for us to have immediately available or available sufficient munitions in the conflict to last [deleted].

Senator HART. How much is that?

General FULWYLER. Roughly around [deleted].

Senator HART. How many airlift sorties would that require?

General FULWYLER. You mean in carryover? I don't know. I can figure that out.

Senator HART. Could you?

General FULWYLER. Yes, but again I would certainly——

Senator WARNER. In the first place, you do not have an inventory now.

NO BINARY INVENTORY

General FULWYLER. No, we don't have an inventory of binary munitions. We are hypothesizing that you have got a binary and we store them here rather than in Europe. I think that deterrent, again, is greatly enhanced even if we don't deploy them to have the capability, have it in the stockpile in the United States and again, I think we could start deploying that before

Senator HART. I understand, but I am trying to attach a sortie number to the [deleted].

GENERAL BURKE. You just have to airlift the first [deleted] days and then you would continue to resupply by sea.

Senator HART. Would you give the committee your calculations of how long you think that would take?

Mr. PERLE. If I could add something——

Senator WARNER. Well, we had better get the Navy in.

Admiral SMEDBERG. I would only suggest that I certainly agree with my counterparts, Mr. Chairman. Certainly the readier they are in place the better the deterrent and certainly one can hardly conceive of—you know, either the war has started or the war has not started or such a situation, but one when certainly tensions are building up and in fact that is the time that the decision would be made with respect to deployment whenever that happened to be.

I can certainly envision that our allies might even be pushing for us to hurry and get these things over here if the situation is getting that tense.

Senator WARNER. Well, that gets back to a threshold question. Have the allies received anything comparable to what we received earlier this morning from 9:30 on?

Mr. **Gaspari**. Yes, sir. Last year, 1980, 1981—well, in 1980 the entire NATO military committee received this Soviet threat briefing which was a condensation of what we actually had at the time.

UNITED STATES ONLY NATO MEMBER POSSESSOR OF CHEMICAL WEAPONS

Senator **Warner**. Yet we alone are the only country, as the Secretary says, in NATO that possesses chemical weapons.

Mr. **Perle**. Yes.

Senator **Warner**. Senator Hart, have you finished your questions?

Senator **Hart**. Yes, Mr. Chairman. Obviously the air lift and sea lift for moving these munitions are going to be very busy moving personnel and other equipment. I hope we will get some answers as to how many planes and ships it will take and how long.

Dr. **Wagner**. Sir, to flesh that out, it might be interesting to contrast the tonnage of chemical munitions with the tonnage of all kinds that would have to be transported to Europe. My guess is it is a small fraction of the total number.

Senator **Hart**. I would also quarrel with the Admiral's conclusion that in a period of heightened tensions the Europeans are going to ask for the chemicals. Chemical weapons would kill a lot of civilians.

Mr. **Perle**. Senator, I am hopeful that we will not for the future face the degree of anxiety we are now experiencing with the NATO allies on this issue and some other issues and that the case for maintaining an adequate deterrent to the Soviet use of chemical weapons is sufficiently compelling so that in a less emotionally charged atmosphere we will be able eventually to settle on a deployment plan that would involve some chemical weapons in the theater. We are 2 years away from the production.

I think the alliance is going to be in deep trouble if the current level of anxiety exists over the long term. We are doing the best we can to cope with the fact that for the time being at least it is very difficult in Europe to talk about the introduction of new weapons of any kind—like chemical weapons or enhanced radiation weapons.

But if we make the decision now not to modernize our deterrent because the climate is hostile to the deployment, then we won't be able to improve our deterrent posture at some point in the future when the climate may be more receptive. It is a problem we are going to have to live with until the politics of the alliance becomes more favorable to a recognition of the real defense requirements of the alliance as a whole.

NATO TROOPS AT A RISK?

Senator **Warner**. Well, to close on that, General Fulwyler, do you think that our troops now in NATO are at risk because of the inadequacies of our chemical weapons capability?

General **Fulwyler**. I think the lack of a credible chemical capability represents the greatest vulnerability to our soldiers in service in Europe.

Senator **Warner**. General?

General **Burke**. Yes, sir. I think of all the imbalances that we look at, the one that frightens me the most is this terrible asymmetry in the chemical warfare, because it is an area in which the offense does dominate the defense and we can't just redress the problem by buying all the protective gear in the world and I think our air bases [deleted].

Senator **Warner**. Admiral?

Admiral **Smedberg**. I certainly agree with that totally in the context of the European scenario. From the purely maritime standpoint, surely tactical nuclear weapons and, indeed, conventional weapons pose as much a threat to ships at sea. As we approach the beach, however, in amphibious operations, we think very strongly that chemical weapons can pose a terrible threat to our amphibious operations.

So indeed that is why our first priorities go to amphibious forces.

Senator **Warner**. All right. Secretary Perle?

EMPHASIS ON DEFENSE

Mr. **Perle**. As our program proceeds, and as the emphasis on defensive measures becomes clear, and if one looks at the size and distribution of the budget, it is clear that our principal thrust is on mounting an effective defense and protective measures. It may be possible in due course to have a more rational discussion on the last element of the deterrent program, which is some offsetting offensive capability, and I believe we can carry on that dialogue with our European allies and eventually achieve agreement on some system of forward deployment, but we do not now have plans to do that.

I think it would be unwise and unnecessary, given the fact that we are a few years away from production, to inject that issue into current discussion in Europe.

Let me conclude by simply saying that our modernization program is essential to deter the Soviet use of chemical weapons until such time as we have a better solution. A better solution would be a comprehensive and verifiable total ban on the stockpiling and use of chemical weapons. We very much hope that can be achieved, but it would be risky in the extreme to defer the modernization of our own chemical weapons program in the hope that an adequate and verifiable agreement is going to come our way in the absence of a modernization program.

That concludes, Mr. Chairman, my opening statement. Dr. Wagner is here to address the specific programs the administration is proposing.

Senator **Warner**. I think you will insert at some point, Dr. Wagner, a breakout of the budget submission for the record.

Dr. **Wagner**. Yes.

[The information follows:]

Category	Millions	Comments
Total protective measures	$508	
R.D.T. & E.	(236)	
Procurement	(189)	Includes $75.5 million for Army stock fund WRM.
O. & M.	(73)	Mostly for protective clothing.
Military construction	(9)	

Category	Millions	Comments
Total retaliatory	123	
R.D.T. & E.	(32)	
Procurement	(54)	$30 million for munitions; the rest for production equipment.
O. & M.	(18)	For maintenance of current stockpile.
Military construction	(19)	Includes $1.2 million for a maintenance facility at Johnston Island.
Total demilitarization	74	
R.D.T. & E.	(13)	
O. & M.	(61)	
Grand total	705	

Senator **Warner**. At this point, Senator Pryor, would you like to ask a question?

Senator **Pryor**. Well, Mr. Chairman, I am, one, an interloper and you were so kind to invite me and I am sorry I could not be present at the beginning of the briefing, but I wonder, if we might, why don't we continue with the testimony and then perhaps later on I will have a question.

Senator **Warner**. All right. We will go now to Dr. Wagner.

STATEMENT OF DR. RICHARD L. WAGNER, ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

Dr. **Wagner**. Senator Warner and Senator Pryor, before I describe the program that the DOD has laid out, and I will be supported in that activity in some detail by Dr. Gold and Generals Burke and Fulwyler and Admiral Smedberg, I would like to make a comment about how we are going to manage this program within DOD.

Almost 2 years ago the Defense Science Board sponsored a study on chemical warfare which made a number of recommendations on the matter and I would like to commend that study to you. One of the recommendations was that the Office of the Secretary of Defense begin to simply put more focus on this work.

Senator **Warner**. Is the 1983 program compatible with the recommendations in here?

Dr. **Wagner**. To a large degree it is.

Senator **Warner**. No major disagreement?

Dr. **Wagner**. No. About 1 year ago, the Secretary decided to create a focal point for chemical matters in my office, which is the Office of the Assistant to the Secretary for Atomic Energy. At that time we had one person in OSD who was following the chemical work. We now have four, a number which is about comparable with the emphasis we put in terms of manpower on other areas of development programs.

We have recently appointed—in fact he has been in place for about 2 weeks now—Dr. Ted Gold, here to my right, who is my deputy for chemical warfare and will be the focal point in OSD for the chemical warfare programs.

I chair the Chemical Warfare Steering Committee within OSD. We have begun to function and I think function well in concert with the Services, the Department of State, and the NSC. We are beginning to pull this program together now.

I think we have a good feeling for the broad outline of the program and are beginning to dig into the details in some depth.

You have heard this morning about the Soviet program. You have also heard, in marked contrast, what the U.S. response over the last decade and somewhat more has been to that same program. Our retaliatory capability has substantially declined. The munitions are becoming obsolete. We have not produced an agent or filled new munitions since 1969. We are deficient both qualitatively and quantitatively in the defensive and protective material that we have available for our troops. We have neglected training and doctrine, and I think because of a sort of cause-and-effect loop we don't have the quality of infrastructure, the manpower and the dedication and the facilities that we had some time in the past and that we hope to reestablish within the Services and within the civilian community.

CHEMICAL WEAPON ADVANTAGE

As has been said several times, we feel that this asymmetry between ourselves and the Soviet Union certainly provides no incentive for them to negotiate seriously on this matter, nor to moderate the intensity of their own program and, in fact, one might argue that the Soviets, as General Fulwyler implied, may see the use of chemical weapons on the battlefield as that capability which could make the difference in their view and would therefore be tempted to use it.

So we intend to put together a program which will demonstrate for them that they will not have that kind of an advantage. It has been talked about from time to time, especially over the past decade of neglect of this program that one might rely on the use of nuclear weapons to deter the Soviet use of chemical weapons. We feel that is not an appropriate response to the Soviet program. I think it is a dangerous thing to do.

I think we do not have the kind of advantage in theater nuclear weapons that would be required to rely on that to deter a lower level of warfare, as I believe chemical warfare is. So we believe that we must modernize our chemical program in response to the Soviet posture and not rely on nuclear weapons.

NUCLEAR VERSUS CHEMICAL

Senator WARNER. Do you suggest from that, that at present our relative inferiority in this area of CW almost forces us to the nuke option in the war of escalation?

Dr. WAGNER. Today, sir, I believe we have a real dilemma. I believe, as General Fulwyler said, that we are at a substantial disadvantage in this regard, yet I would certainly not want to say that today we could deter the use of chemicals by the threat of nuclear warfare because I believe that is not a credible response. [Deleted.]

Senator WARNER. To the chemical?

Dr. WAGNER. Yes, to the chemical threat.

Senator WARNER. So if the Soviets inject, say, in a frontal attack on NATO the use of CW, bascially what we may have there is so inadequate we would be forced to the nuclear attack option?

Dr. WAGNER. I think that would be a very hard decision to make, sir.

Senator WARNER. Secretary Perle, these are the type of debates that are going to go on on the floor.

Mr. PERLE. Yes. I started to comment on this earlier in an exchange with Senator Hart when the question was asked whether the maintenance of an offensive capability on our part was the only way to deter the use on the Soviet side, and I said I thought there were other ways, but the other ways are exceedingly unattractive, and the one I had in mind was the use of nuclear weapons.

NUCLEAR THRESHOLD AVOIDABLE

I think if we found ourselves in a situation where the only response we could make to the use of chemicals by the Soviet Union was the use of a nuclear weapon by the United States, we would find it very difficult indeed to make the decision to cross the nuclear threshold and I think it would be a tragic dilemma because it is avoidable. We can in fact find a better response and I believe the program we are proposing is a better response.

Senator WARNER. Do you want to follow up on that?

Senator HART. Is there any particular reason why the Department's fiscal year 1983 budget, the Defense Department's, provide $50 million less than last year for defensive chemical equipment?

Dr. WAGNER. Yes, sir. In 1982 there were. This caused a peak in procurement during 1982. The fiscal year 1983 budget is an increase over the projected funded level that would have been fixed without that peak.

Now our program as we lay it out does in fact put the bulk of the funding on defensive protective equipment and it is simply that we are——

Senator HART. Well, wait a minute. We have got to get antecedents to all of this. The bulk of what funding?

Dr. WAGNER. The total funding in the 1983 program although the fiscal year 1983 defensive procurement is lower than 1982, as we plan our program out into the farther future we certainly expect to procure and spend considerably more in defensive equipment than on retaliatory equipment.

Senator HART. Well, given all that you all have said today, why is it being cut back?

General FULWYLER. Senator Hart, I can answer that. It is bacause we have done so little for so long. Last year represented some one-time procurements, large numbers of defensive items and that is what drove the number up last year and this year, in the 5-year program one continues to buy at a more level buy. That is what happened. We had to make some large one-time procurements.

General BURKE. Additionally, I can speak for the Air Force. We made a conscious decision to hold back a little in 1983. We are not satisfied with this first generation of equipment out there. So ours ramps up very steeply as the years go on.

Senator HART. The point I am trying to get at is that the witnesses and the committee talk in general terms about the chemical warfare program, and I cannot parse out how much of it is for binaries and how much of it is for other things. I am concerned here that we are getting deluged with statements about how the Russians are 20 years ahead of us and how they have got this and how they have got this, yet we are cutting down in defensive capability. That makes no sense to me.

General Burke's statement is the first thing that makes sense to me at all. I guess why I feel so strongly about this is that 3 or 4 years ago Senator Nunn and I introduced legislation that instructed the Defense Department to get cracking on defensive capabilities. Now we hear phrases like "we have let this program lag." Who has been letting the program lag? It has not been this committee.

Dr. WAGNER. No, sir, I do not think it has. I believe, however, that just until the last few years the Defense Department as a whole, for whatever reasons, has not given this program the attention that it should. We will present for you specific numbers for our program. About two-thirds of the next 5 years' funding will be for protective measures.

Senator WARNER. Of one kind or another.

Dr. WAGNER. Of one kind or another. However, as General Burke said, for the last couple of years and continuing on into this year, we are fundamentally in an R. & D. mode. We are in an R. & D. mode as to defensive equipment and, to some extent, for offensive equipment.

So the major increase in the procurement of defensive equipment will not come in 1983. It will go higher in the years after that.

Senator HART. So this gap that exists now, that General Burke and General Fulwyler have commented on, will not be closed, will not be able to be closed defensively because of the necessity to go forward with some R. & D. Is that right? So we are going to try and close that gap as much as possible with offensive capability?

CLOSING THE CHEMICAL WEAPONS GAP

Dr. WAGNER. No, sir. I think the offensive capability will also not come on line for a few more years. I believe they will both phase up at about the same rate, although we will spend considerably less money on the offensive capability than on the defensive capability.

But I think the gap will not be closed for 3 or 4 more years.

Mr. PERLE. This year, Senator Hart, 72 percent of the funds requested are for the defensive side—protection—only 17 percent for retaliatory elements of the program. That ratio is consistent throughout the program.

Senator PRYOR. At this point what is the actual figure, dollarwise?

Mr. GOLD. In fiscal year 1983 it is about $705 million.

Dr. WAGNER. Of which $508 million is for protective measures and about $123 million for retaliatory work, of which only $54 million is actual procurement.

Senator Hart, would you like to go into these numbers in more detail? We had been going to develop them as we go along.

Senator **Hart**. There is a school of thought that says we ought to be doing everything we can on the protective side and that we have not been doing so and that was the question.

General **Fulwyler**. I go into the Army's part, Senator.

Dr. **Wagner**. We will be doing everything we can as fast as we can. We believe this is a vigorous program. We do, however, have some items in development that are simply not ready to procure in quantity yet.

PROTECTIVE, RETALIATORY, AND DEMILITARIZATION

That chart shows the three basic parts of the program—the protective, the retaliatory, the demilitarization—and in fact there is really a fourth part which is kind of implicit, which is the technology base and the infrastructure, getting good people into the program, building up the quality of the laboratories, building up the number of people devoted to these activities within the services.

So those are really the four parts of our program.

Senator Hart, you asked a minute ago why not depend on protective or defensive measures alone? We are going to emphasize those. We have thought a lot about that and I think there are three reasons, really.

PERCEPTION BY SOVIETS

The first one is a matter of perception, I think, on the part of the Soviets. I think if they saw us simply developing defensive capabilities only, without a retaliatory capability, I think in fact that they would not respect that posture as much as if we included a retaliatory capability. That is kind of an imprecise, nonquantitative aspect of it.

DEFENSIVE POSTURE

The second reason is that even with a good defensive posture it is our belief that the operational capability of fighting forces in the protective equipment and having to take the measures that constitute a defensive posture imposes a substantial reduction in operational capability. Now General Fulwyler, I believe, a little bit later may mention some specific measures of degradation of effectiveness. Our position today, I believe, is that we know something about what small units and individual soldiers and airmen can do in the protective equipment and you see substantial degradation which will be described.

There are a couple of other factors that are going to take us longer to get our hands on. Those are the fact that tests so far to date have not been done while people are being shot at, which we sort of feel might add an additional measure of degradation to having to fight in these bulky garments and take them off and put new ones on from time to time and to decontaminate the equipment.

Finally, we have not yet looked at how to quantify the degradation in the intricacies of how units have to work together, for instance—or even how small groups of individuals have to work together. It is hard to tell who is who. It is hard to communicate.

Senator HART. Well, the Soviets have the same problems, don't they?

Dr. WAGNER. Only if they must operate in a toxic environment. Only if we retaliate.

Senator HART. Yet they are preparing to be able to use these weapons. They are spending a lot of money on protecting their troops and equipment. So any degradation they have we have too.

Dr. WAGNER. They would have exactly the same problem and in fact it is exactly because of that that we feel because of this degradation we feel we should not rely only on a defensive capability alone but should have some retaliatory capability to pose the same problem to them, so that they would be degraded in the same way in their operational capability. It is our belief that they then would see no benefit in initiating chemical warfare.

I think that the point that I wanted——

Senator HART. Well, if they start throwing the stuff over their shoulders, as one witness said, they are going to have to have their suits on.

Dr. WAGNER. Not necessarily, only the victims of a chemical attack are forced to take protective measures. Additionally, it is not clear to me that it is only in the defensive retrograde kind of maneuver that you might expect that kind of activity.

Mr. PERLE. It depends on how far they throw them, Senator. Obviously at longer ranges they do not have to be encumbered, and part of the problem is that we are significantly outranged. That is, they can strike us with chemical weapons at distances at which we are not presently able to respond.

Senator HART. Because ours are here.

Mr. PERLE. No, some of them are there. Even there they can only be delivered at short ranges. We lack a good capability to degrade targets beyond artillery range.

Dr. WAGNER. I think a third reason why we should not rely only on defensive measures is that, in fact, it takes some time to get into a defensive posture. We see the Soviets practicing especially with their battlefield missiles, their tactical ballistic missiles, very well coordinated, very intensive surprise strikes. That is a theme that runs through all of their operations—very quick, massive surprise, application of force—and with the capabilities we have today we probably would not have sufficient warning to rely on being in the protective equipment.

Therefore, in order to deter him from using his own offensive capabilities, we need both the combination of the protective equipment and the retaliatory capability ourselves.

Senator HART. Well, I do not mean to press this point again, but let met just hypothesize that if we move some of the stuff over there, because we have got to have adequate warning——

Dr. WAGNER. I am sorry. The kind of warning I meant was tactical warning during the course of a battle.

Senator HART. All right.

MODERNIZED RETALIATORY CAPABILITY

Dr. **Wagner.** So we feel that we should put together a modernized retaliatory capability.

The next feature and the last one that I want to go through before I turn the floor over to Ted Gold to talk about our programs in more detail, is that we feel the modernization should come via the route of binary weapons, newly built.

Our current stockpile, as General Fulwyler mentioned earlier in the day, most of it is in bulk form. It would cost a substantial amount of money to build new unitary munitions and fill them, even from the stocks we have today. The delivery systems for many of the munitions are going to be phased out of use by ourselves and by NATO by the late 1980's. In fact, only about [deleted] percent, perhaps [deleted], of the stocks that we have today will be in useful form.

Senator **Warner.** By what date?

Dr. **Wagner.** I think it is [deleted].

Senator **Pryor.** Would you repeat that? I did not understand. We are phasing out what in NATO?

EXISTING STOCKPILE AND DELIVERY SYSTEMS

Dr. **Wagner.** Some of the delivery systems—the 105-millimeter artillery round, for instance.

Mr. **Gold.** Land mines, mortars, and spray tanks.

Senator **Warner.** The biggest portion of the United States stockpile is in 105's, and as I understand in U.S. forces in Europe today there is only a handful of 105 tubes left.

Dr. **Wagner.** And going down.

Senator **Warner.** And going down, so there is a tremendous disparity between the existing stockpile and the delivery systems in U.S. forces/NATO.

Dr. **Wagner.** Another deficiency of our current stockpile, is a lack of weapons, for striking deep targets to degrade unit effectiveness.

The capability that we have today to strike targets in the rear echelons is limited because the agent in the bombs is not persistent and, therefore, does not impose the kind of continuing burden of operating with protective equipment that we would like to see. The persistent agent that can be delivered is in spray tanks [deleted].

But I think maybe more than the current deficiencies is our feelings simply that the binary munitions simply are in fact the way you would like to go in any case. They are simply safer. They are more flexible. They pose some advantages for deployment. They are safe to have in one's hands.

BINARY MUNITIONS SAFEST

One of the incidents that occurred during World War II, as I understand it, was a chemical stockpile which was brought under enemy fire and some of the chemical was dispersed, and with binary munitions that would not have been the case.

I think we feel also that much as we feel about the nuclear weapons that it simply is our fundamental responsibility in handling these weapons and producing the agent in this country that we simply must be as safe as we know how. The American public will not allow us to undertake an activity for which there is a safer alternative than the one we would undertake, and we believe that binaries are the safest, most effective way to go.

With that broad overview of the program, let me turn the floor over to Ted Gold.

STATEMENT OF DR. TED GOLD, DEPUTY FOR CHEMICAL MATTERS, OFFICE OF THE ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

Dr. **Gold**. Thank you. Fortunately I am going to have to be brief—this is only the beginning of my third week on the job.

Senator **Warner**. Do you come from an area of expertise in this?

Dr. **Gold**. I come from an area of expertise in national security, in R. & D., but not specifically in chemical. So my experience specifically in chemical is now several weeks long.

Dr. **Wagner**. I should give him a little more credit than that. Ted has been in my office in Atomic Energy for a number of months and, 3 or 4 months ago, when we were beginning to write the report to Congress that you have before you we turned to Ted to pull it together and I think he did just an excellent job.

His background has been in a wide range of national security-related things, many nuclear, but much of that experience focused on the integrated battlefield. He has worked closely with the Army over the years in understanding the connections between nuclear and conventional warfare on the tactical battlefield and I think that that is going to be an important part of putting nuclear into that integration—I am sorry, putting chemical into that integrated battlefield will be an important part of what we have before us. So I think he did not quite give himself credit.

Dr. **Gold**. I will provide a general summary of the program and then the Service representatives will provide a more focused exposition of their service activities.

SOVIETS POSE SERIOUS THREAT

First let me briefly iterate what I think are the three major points we have gone through this morning. One, in spite of intelligence gaps which I believe are on the same order of the gaps we have on other Soviet activities, there is a threat that prudence says we must take seriously.

The second point is that improved defenses, improved protection against chemicals, is necessary but not a sufficient condition to address the battlefield advantage the Soviets would have if they use chemicals. This afternoon you will be hearing from people far more expert and experienced than I, but part of my first 2 weeks were spent down at the Army Chemical School at Fort McClellan, Ala., trying to learn what it is like to exist in the chemical environment. I tried on the masks, gloves and equipment. I tried to fire an M-16 rifle with the mask on. I went through the procedure, the very awkward and time-consuming decontamination procedure.

You start getting a feel for the logistical burden to which any unit, any force in the field, has to assume in a contaminated environment, and to think that we can redress that asymmetry when our side, the NATO side, has to operate encumbered by protective equipment and to allow the other side to basically work unencumbered by protective equipment except at the times and places of its choosing, I think, just is not in the cards for the foreseeable future.

Conceivably, after very vigorous R. & D. activities there might be some medical breakthroughs in the future, but reliance on protection only or primarily on a protective posture to deny the Soviets the significant military advantage they would have by going chemical is just not in the cards.

FORCING THE ENEMY INTO PROTECTIVE POSTURE

So the third major point is that we need to have the capability to force them into a protective posture. The primary requirement is not to induce casualties because theoretically you can be protected against it, although casualty production would be very useful. The primary requirement for a retaliatory posture is, as Senator Hart said, to force any initiator of chemical warfare into his protective posture. The protective posture is an encumbered posture and therefore he is much less capable to conduct operations.

So there are three points. (1) Prudence says we must take the threat seriously, (2) defense is a necessary but not sufficient and, therefore we need a retaliatory part, and (3) our current stockpile just does not have the agent mix and the type of weapons to carry that out.

These three points essentially form the rationale for our program. Following that rationale, our program has two elements—the protective element where the bulk of our resources are going, and the retaliatory element. In actuality, I guess we can consider a third element—the problem of disposing of our obsolete stockpile, the demilitarization problem, which is a tough enought problem in its own right.

CHEMICAL PROTECTIVE PROGRAM

The objective on our protective program is basically to insure that our troops cannot only survive the chemical attack but have the ability to sustain operations with as little degradation of performance as possible. To do that we are in the process of doing three things.

One, is to procure sufficient number of quantities first generation equipment and distribute this to the troops. No. 2, as Dr. Wagner alluded to, is to establish a vigorous technology base in this area. It does not exist today. It might have existed in the 1960's. My own experience in this program obviously does not go back that far. It is vital to insure that we can get the better equipment in the field. It is equally vital to insure that we are not surprised by what the enemy has.

The third part of it, and certainly not the least, is to develop appropriate doctrine for operating in the chemical environment and to institute relevant training. In some cases I think this last part probably is the most important of all, and I think some of the recent improvements that have been made in the last few years are in this area. The reestablishment of the Army Chemical Warfare Training School at Fort McClellan is a very important step in this area.

We said there has been recent progress. The protective part did not start this year. It started several years ago. Most of the progress has been made not only in the awareness of the problem but in the procurement and distribution of individual protective equipment and, again, the institution of relevant training.

Serious deficiencies still exists in the quality of individual protection across the board and in other aspects of protection—collective protection, detection and warning, decontamination and medical—and you will be hearing about those from the services.

RETALIATORY IMPROVEMENT SOUGHT

The second component of our program is retalitory. There our objective is rather clear. We want the safest, smallest stockpile that can credibly force the other side into a protective and degraded posture if he uses chemicals first. We need to do that in depth on the battlefield. We need to be able to handle several fronts simultaneously, and we need to be able to sustain operations long enough so that he cannot perceive any easy victory. So we need more than just a day or two supply of chemical munitions.

As you have heard today, our current stockpile is severely deficient in providing that capability.

Our program to improve the retaliatory portion has two elements. One is to improve the readiness of our current munitions. You have heard this morning there are currently almost [deleted] of munitions either in the ready-for-issue or repairable status. Due to obsolesence of delivery systems, particularly the 105 and others. By the end of the 1980's we will be down to around [deleted].

So, therefore, the second part of the retalitory program is to go ahead with the development and procurement of binary weapons. There are two weapons in the plan now, the Bigeye which fills a big gap in our capability. We currently do not have any credible capability to hit rear echelon targets. The Bigeye will be a major step forward in redressing that deficiency. It is filled with a persistent agent, which is the best kind of agent if you want to give him troubles dealing with a permanently or long lasting contaminated environment and give him trouble bringing up his rear echelon troops and supplies and degrade his air bases.

The second weapon we will procure is a model 155mm binary shell which will give us an all-weather capability without the logistic and safety problems of the current 155 rounds, to handle the close-in targets. This is a nonpersistent agent which again is the appropriate kind to use along the front where we might want to reoccupy the area.

NO ARMS RACE WITH SOVIETS

There is no need to, nor do we have any plans to compete with the Soviets in any type of arms race with regard to the number or types of chemical munitions. Our objectives here, based on the military requirement, is to force them into a protective posture and therefore a degraded posture, should they initiate chemical weapons use. To a large extent, our munitions stockpiles requirements are relatively independent of the numbers he has in his stockpile, not totally, because of the length of time you have to use them, but depending on his targets generally the requirements depend on the number of suitable targets in the force structure.

So, we have important but, I think, relatively limited aims for our chemical stockpile.

DEMILITARIZATION

With regard to the demilitarization program, we have some moneys in the budget this year and we are going to start to demilitarize some of the more serious problems in the stockpile. Our major hope is for an R. & D. program that will within a few years tell us how to do this major activity in as economical a process as possible. We have developed safe technology but it is expensive.

In summary, again, as you heard here this morning, let me close out by reiterating that we have no enthusiasm for these weapons. I did not accept this position because I am enthusiastic about chemical weapons. I accepted it because I thought I had something to contribute in helping to evaluate our needs in this area and managing a program in the most cost-effective manner.

COMPLETE AND VERIFIABLE BAN

Our aims are limited. Until we reach our ultimate objective, a complete and verifiable ban, they are to deter the Soviet use of chemical weapons against us and our allies. Such use today would give a very serious battlefield advantage to them.

Senator **Warner**. Let me just take off on that question—"very significant." Has anyone tried to quantify this that could speak intelligently in public?

Dr. **Gold**. Over the last year or so there have been a few studies which I am familiar with. My understanding is that the Soviets would gain force multipliers on the order of [deleted] by using their chemical stockpile now, particularly in the NATO environment. Force multipliers on the order of a [deleted] are the kind of numbers that are coming out of the studies.

Thus, their use of chemicals against us now are the equivalent to, again, in gross scale [deleted] of conventional forces they have, so it is a significant and powerful motivator for them to use it on the battlefield.

Senator **Warner**. I am beginning to think there is another motivator and that is it enables them not to use tactical nuclear weapons. They gain that advantage at the same time they are not forced to that option.

In distinction, we are forced to an earlier [deleted] because of our shortage. Is that a correct statement?

Dr. **Gold**. I believe it is. Also, the current asymmetry in chemicals tends to negate the improvements that we are striving to make in the conventional area.

Senator **Warner**. Would you repeat that again? I am not sure I understood it.

Dr. **Gold**. The point is if we allow them to maintain a significant chemical advantage, that would tend to negate the improvements we are making in our conventional area. They could use the chemicals, therefore, to regain their significant battlefield advantage that we are trying to reduce with precision guided munitions and a whole spectrum of improved conventional munitions.

Senator WARNER. What you are saying is we waste our money to upgrade our conventional forces unless we deal with this problem. You know, I have got to communicate this problem to the public.

Back to your report that was submitted in March of 1982—this month—in response to a request by the report on the fiscal year 1982 defense appropriations bill, I read through here in the last 15 minutes the section on NATO and it seems to me, Secretary Perle, that is unresponsive to the Appropriations Committee direction to conduct "a country-by-country report from our NATO allies with respect to their official views on the long-range program."

I am going to need this. I think you can bolster this NATO thing. I dealt with NATO myself for 13, 14 years and I have been in and out of the Pentagon and over here. They are intelligent people and it seems to me as I look at this problem they are being an ostrich in the sand on this issue. Is that a bad metaphor?

What is the root problem? Granted in the last 2 or 3 years relationships between the United States and NATO have deteriorated. They were very strong 5 or 6 years ago, 8 or 9 years ago when this chemical problem had its origin—that far back. Who could enlighten me on that?

Mr. PERLE. I think we could make some judgment about the attitudes of various NATO members on this question. I think their underlying sense is that because we are some years away from having to face what they anticipate is a difficult political judgment they would rather not do it now. They would rather defer having to give serious consideration to what their response would be in the event we came to them with a proposal for forward deployment, because the atmosphere at present is not hospitable.

Senator WARNER. I understand that, Secretary Perle, but I cannot understand a general officer or chief of staff of, say, the German Army or the Belgian Army saying that I want to put my troops up there in that position of risk in the front line without sufficient deterrent for this type of warfare. Who is thinking along that line?

Mr. PERLE. Senator, I do not think there is any question that among the professional military in NATO there is a recognition of the problem that follows very closely along the lines of our appreciation of the problem. That is a little bit different from formal commitments and publicly articulated positions by the governments involved.

But I think we could be helpful in sharing with you the impressions that we have obtained in direct military-to-military discussions.

Senator WARNER. Then here we are—and just by coincidence I was reading the biography of MacArthur over the weekend. And on the same battlefield, if you take a certain geographic area, but right there in Europe in World War I all of that history of gas warfare and chemical warfare and yet those very same countries were engaged in that struggle and were witness to that struggle are now like an ostrich putting their head in the sand. I cannot understand that.

Have I got a blind side or is there an answer to this? It has not just developed in the last 2 or 3 years. This problem goes back for a decade.

Mr. WAGNER. I think there is a public view of chemical warfare as being in some way even more abhorrent and horrifying than nuclear warfare. I think people think of nuclear warfare as being in some way clean. You are vaporized or you are alive and you see the effects that the chemicals have on people and it is pretty horrifying.

I think, in fact, that may be well what underlies the political judgment, which I think Mr. Perle has said, on the part of our allies not to want to deal with the chemical warfare issue with their publics. However, I guess I believe that this is a very clear-cut case where we should be able, if well said, well articulated, to make the point that by building up our own capability we are going to make it much less likely that those horrors will occur. I think we can do that, but I think that argument has not been made.

Senator WARNER. I couldn't agree with you more. But then we come to this question of the sectors in NATO. You have got the U.S. sector, the other NATO countries, and other sectors. It is all very puzzling to me. I do not think the Soviets are going to be that selective.

They may well strike the chemical weapons against the non-U.S. sectors because we have some modicum of retaliatory capability and therefore NATO is in greater jeopardy.

Mr. PERLE. There is, Senator, a general recognition within the alliance and, indeed, a formal commitment to improve the defensive capability of the alliance. I think these countries reason that because the United States alone is developing a retaliatory capability this is an issue they can afford not to address and I think the fair answer to your question is some ostrich-like attitude, yes, it is.

They are simply counting on us to assume the burden.

Senator WARNER. But there [deleted] and they in effect are depending on us. Is that correct?

Mr. PERLE. Yes; that is correct.

Senator WARNER. And there is a real schism between those who wear the uniform and those who deal with the political aspects.

Mr. PERLE. I think that is correct.

Senator WARNER. You will in a more thorough manner reply on the subjects of this March 1982 report before we go to the floor.

ALLIES DEFENSIVELY PREPARED

Mr. PERLE. I think in fairness, some of our allies have done better than we in the defensive matter. The British, for example, are better organized defensively than we have been.

Senator WARNER. What percentage of the troops over there have a defensive capability? Is there any breakdown on that? What is ours? What is the United States?

General FULWYLER. All of our soldiers, sir, over there have been provided defensive capabilities to survive [deleted].

Senator WARNER. Every individual. Does that include the Air Force?

General **Burke**. Yes, sir, but we would estimate that we can operate for about [deleted]—operate, not just fly.

Senator **Warner**. [Deleted.] Well, we are going to give you a chance to think through that response and amplify it.

Well, we welcome you, Senator Exon. I saw you come in a few minutes ago. I think we have got the record tightened up from the panelists. We are about to go to the military part of this panel, but, Senator Exon, if you have some comments or questions or Senator Pryor——

Senator **Exon**. No comments, Mr. Chairman. I just have a question or two I would like clarified. First, Secretary Perle, the testimony you have here is not marked secret, is it?

Mr. **Perle**. No, sir, it is not.

Senator **Exon**. In other words, we can take this along and talk about what you have here.

Mr. **Perle**. Yes, sir.

Senator **Exon**. Now clarify for me, if you can—and I apologize for being late; I was detained this morning—I think this is a very critical matter and I am glad that the chairman has gotten some expert testimony on the record.

NO-FIRST-USE CONCEPT

You say on page 3 that you are aware the United States is involved in two treaties and one is the no-first-use concept, which I presume came out of the gas warfare of World War I. Is that correct?

Mr. **Perle**. I think the experience of World War I was very much in mind when the Geneva Protocol was negotiated in 1925, yes.

TOXINS PROHIBITED

Senator **Exon**. Now you say we have a second treaty that says toxins are prohibited regardless of their origin or method of manufacture. You go on to say consistent with these treaties the United States will not use chemical weapons unless they are first used against us by our enemies, and then you go on to say also the United States does not and will not under any circumstances possess or use biological or toxin weapons.

Will you please clarify for me the difference between biological and toxin weapons that you say we will not under any circumstances possess or use and this material that we are talking about that we are starting to produce in Pine Bluffs, Ark.?

Mr. **Perle**. Let me try, and if I can get into some kind of problem we can defer to the doctor, but we did get into this earlier in a somewhat different context.

As I understand it, the biological or toxin weapons that we have made a deliberate policy decision not to develop are weapons based on biological material of biological origin, of the type that we believe are now being used by the Soviets in Southeast Asia. We entered into an agreement in 1972; it was ratified in 1975, not to acquire or use such weapons. We have no program to do so.

That agreement was entered into with the full knowledge that it was not verifiable and indeed it remains unverifiable. The weapons that we are talking about producing, the chemical weapons, are chemical in origin rather than biological.

Senator **Exon**. Well, it seems to me if you are going to do harm to somebody, you are splitting hairs.

Senator **Warner**. Senator Exon, I think you have got a good point. We ought to tighten this up on the record. Let's take it step by step.

CHEMICAL WARFARE IN SOUTHEAST ASIA

What is being used in Southeast Asia, the yellow rain? Is that precluded under this treaty?

Mr. **Perle**. The mycotoxins that we believe are being used in Southeast Asia are being used in contravention of the Convention on Biological Weapons.

Senator **Warner**. Which is the 1972 treaty.

Mr. **Perle**. That is correct.

Senator **Warner**. Describe the effect on an individual of that particular toxin.

Mr. **Perle**. I have read the same sorts of accounts, Senator, that you have read in the press, which give you a medical description.

Senator **Warner**. Let's defer to the doctor.

General **Rapmund**. Sir, I am General Rapmund, Assistant Surgeon General of the Army for Research and Development.

The signs and symptoms of mycotoxin poisoning are very broad. They have been written up in the lay press to include hemorrhagic syndrome, to include vomiting, to include dizziness, convulsions and death within a few hours—a very toxic material, but it is likely that it is dose-related and therefore the degree of symptoms would depend in part on the amount exposed.

Senator **Pryor**. What do you mean dose-related, if I might ask?

General **Rapmund**. What I am referring to, sir, has to do with the amount of toxic material that the person is exposed to.

Senator **Warner**. Whether it is one martini, two martinis, or three martinis.

BINARY PROCESS

Now let's go to Senator Exon's question—what we are proposing to manufacture in the binary process. What is that and what is the effect on the individual?

General **Rapmund**. Well, the two elements in the binary process are ordinary chemicals, sir. They are manufactured in a standard way, as other chemicals would be manufactured in the chemical industry and they are or could be classified as nontoxic materials.

Senator **Warner**. That is all fine. What do they do when they mix together and the person comes in contact with them?

General **Rapmund**. When they mix together, then they make a very toxic chemical compound which is a chemical weapon and in no way can it be defined or confused with a biological toxin.

Senator **Warner**. When it hits the body, what happens?

General **Rapmund**. When that agent hits the body it has an immediate effect upon the nervous system of the body and again if an individual is exposed to enough of it and rapidly, it will interfere with respiration and result in death.

Senator **Warner**. There you are, Senator Exon. If you can draw a line you are a better man than I.

Senator **Exon**. I can't draw a line. It sound like something that happened at the Tidewater Conference over the weekend.

Senator **Warner**. Well, seriously, it looks like under one system you vomit to death or you hemorrhage to death, and the other, as I understand it, paralyzes perhaps the heart muscles.

General **Rapmund**. Respiration.

Senator **Warner**. And you die through respiration and malfunction of the heart and the circulatory system. One is precluded by the treaty and the other is what we are trying to do.

Senator **Exon**. Mr. Chairman, let me make one last comment. Is the Soviet Union a party to one or both of the treaties mentioned in your statements?

Dr. **Wagner**. Both.

Senator **Exon** They are parties to both?

[Dr. Wagner nods in the affirmative.]

SUSPECT SOVIETS VIOLATE CONVENTION ON BIOLOGICAL WEAPONS

Senator **Exon**. And you suspect they are in serious violation of that treaty?

Mr. **Perle**. Yes. I am persuaded by the evidence that they are in violation of the Convention on Biological Weapons.

Senator **Exon**. You made a good point, one of you did here. It is a question—or the chairman—that the people of the United States may be more concerned about this kind of activity than nuclear weaponry. I am not sure that is right, but I think probably we would have some grain of truth to the argument.

Since this is a very serious thing and since we have great difficulty in awakening our NATO allies and the people of the United States to this possible Soviet threat, although there has been widespread publicity given to the happening, but I think it had to do with anthrax in one Soviet town, a lot of people know about that in Nebraska at least. They know something about anthrax.

But let me ask this question. Since we suspect or have strong suspicions that the Soviet Union has violated these treaties, to alert the world to this situation, have we ever thought about maybe not ourselves but one of these European countries that seem to be dragging their feet, like France or one of those countries, possibly taking this up in the United Nations? I don't know what the United Nations is good for other than a debating society to alert world attention.

Have we ever thought about taking this matter, this whole matter, up before the United Nations, if for no other reason than to give it some publicity and getting the world to think about it, or maybe putting some pressure on the Soviets?

Mr. **Perle**. We have indeed, Senator. We have gone to the United Nations where a special inquiry was launched more than a year ago. Its mandate has just been renewed. They are examining the evidence. The United Nations is not the easiest place to produce conclusive findings. They have thus far failed to produce conclusive findings, but there is sufficient evidence based on the first year's work of the special committee to continue work into the second year.

I read an article the other day about the work of that committee in which it was reported that the senior United Nations official involved in the administration of that committee happens to be a Russian and that is one of the many problems we encountered in trying to develop these issues in the United Nations.

Senator EXON. Well, I would only suggest, and I recognize the great difficulty you have there.

You and what you are trying to do to sell us on the idea that we must begin to tell the story—yes.

Dr. GOLD. If I might make the point, I think the major implications of the Soviet use—and as Richard said, there is a very persuasive case—is the fact that they are violating a treaty. To a much less extent it impacts on our modernization program.

If there was no evidence of Soviet use, I think we could come before you, as we did this morning, and give a very persuasive case of the Soviet capability to wage chemical warfare. To the extent that the American public views the Soviet use of the chemical warfare as something we are using to justify our program, I think it really detracts from the major lesson and implications of this, which is they are in violation of at least the international treaty.

So I do not view this as basically a chemical issue. It is part of an overall threat picture that you have heard today, but not essential or integral. It is basically an arms control issue. So I think I agree with you. It should be publicized and pushed, but not to sell our modernization program, which I think can stand on its own two feet.

Senator EXON. Well, one goes—I think maybe we could do more in the United Nations, at least to draw attention to it.

Thank you, Mr. Chairman.

DIFFERENCES BETWEEN BIOLOGICAL AND CHEMICAL

Senator WARNER. Let me put a little something in the record here to tighten up this point. The differences between biological and chemical, it is in the manufacturing process, because I am looking at a list. There is very little difference in the effects. Each of them will kill you.

General RAPMUND. Yes, sir.

Senator WARNER. In slightly different ways, but the significant issue goes back to the manufacturing process.

General RAPMUND. Point of origin, sir, and the manufacturing process.

Senator WARNER. What do you mean "point of origin"?

General RAPMUND. Well, a biological toxin has as its source and its origin a biological process. It is produced by living cells or living organisms and that process can be harnessed to an industrial process, but that industrial process still is based upon a living-cell system. Toxins are prohibited by the Biological Weapons Convention regardless of how they are manufactured.

The chemical, on the other hand, is not produced by a living-cell system. It is produced by molecules interacting with molecules to produce nonlive material.

Senator **Warner**. Well, then, we can list a summary of selected chemical agents, which I will put in the record. Some of them affect blood, choking, blistering, nerves, tears, vomiting and incapacitating. That is just about the whole lexicon of how you stop life.

[The information referred to follows:]

[From Air Force Magazine, December 1981]

CHEMICAL AGENTS

Chemical agents are chemical substances which are intended to be used in military operations to incapacitate, seriously injure, or to kill men through their physiological effects. They must not be confused with bacteriological agents which owe their effects to the multiplication of their organisms within the victim. Chemical agents may be grouped, according to their effects on human targets, into six main categories: incapacitating, vomiting, choking, blood, blister, and nerve agents. Chemical herbicides and smoke and flame weapons are frequently included under the chemical agent heading in literature on the subject but, since their effects are not directed primarily against human targets, they will be excluded from consideration here. An additional category—irritants—does not come under the definition of chemical agents under the Geneva Protocol of 1925, nor are irritants normally used in war. They are, however, used extensively in police and internal security operations. In that context they fall within the technical description of chemical agents cited above, and they are therefore included in the present listing.

IRRITANTS

These relatively harmlesss gases act directly on the endings of the nerves in mucous membranes and on the eyes. There are two groups; tear and sneezing agents. Their effects are immediate, but recovery is rapid when the victim leaves the contaminated area. There is some evidence that, if used in confined, unventilated spaces, they can seriously affect people alredy prone to respiratory ailments. They are not lethal in the open air where they are normally employed. Distribution is usually by aerosol, from pressure canisters, hand or rifle grenades, or cartridges.

INCAPACITATING AGENTS

Intended to act on the mind of the victim, these agents cause disorientation, mental distrubance, and sleepiness, rendering individuals incapable of concerted effort. Their effects are unpredictable but may persist for hours or days after exposure. Complete recovery is expected without medical treatment.

VOMITING AGENTS

These are normally solids which vaporize when heated and condense to form aerosols. They irritate the eyes and mucous membranes and cause vicious nasal discharge, sneezing, coughing, severe headache, acute pain and tightness in the chest, nausea, and vomiting. The effects last for about 30 minutes after leaving the area of moderate concentration. At higher concentrations, effects are likely to last up to three hours after departure.

CHOKING AGENTS

The oldest of military agents, now thought to be obsolete, these attack the cell tissue of the lungs, producing pulmonary oedemas. They are susceptible to atmospheric conditions—particularly wind direction, wind velocity, and temperature gradient—and lack persistence, which limits their tactical flexibility.

BLOOD AGENTS

These agents, which are absorbed into the body by breathing, prevent the body cells from using oxygen brought to them by the blood. This leads speedily to tissue damage. These agents are extremely volatile, dispersing rapidly after deployment. Their use just before an attack would therefore force the defenders to protect themselves, thus reducing their combat efficiency, while the attackers, who would not need similar protection, would retain theirs.

BLISTER AGENTS

These agents, in both liquid and vapour form, attack the protein enzymes and co-enzymes in the body causing inflammation, blister, and general destruction of tissues. The eyes are very susceptible, and burns in the lungs and bronchia obstruct breathing. Blister agents may be odourless, and their effects may not be noted for some period after exposure. They are also persistent. The best therapy against them is rapid and complete decontamination.

NERVE AGENTS

These are highly toxic, odourless, colourless, and hard to detect. They are generally non-persistent, but can be made persistent by adding a thickener. They are absorbed into the body by breathing, through ingestion throught the mouth, or through the skin. They react with an enzyme (cholinesterase) permitting the stimulator acetylcholine to accumulate. This causes the nervous system to lose control resulting in uncontrolled contraction of the muscles, fatigue, paralysis, and disorientation, and gives the symptoms of pin-point eye pupils, bronchial constriction, running nose, salivation, nausea, and diarrhoea. Without proper treatment, death usually occurs within 15 minutes of a fatal dosage being absorbed.

DOSAGE

Dosage (also referred to as 'toxicity' and 'lethality product') of a chemical agent is a function of its concentration multiplied by the time the victime is exposed to it. *CS*, for example, is said to affect its victims instantly, though not lethally, in concentrations of 1 to 8 milligrammes per cubic metre of air (mg/m^3). Adding the time factor, the dosage is expressed as mg/m^3 per minute (mg/m^3/min.). When an agent is lethal, the medium lethal dosage (LD) that will kill 50 percent of the population is expressed as LD$_{(50)}$, and the meduim lethal concentration/time (LCT) that will kill 50 percent of the exposed population as LCT$_{(50)}$. The lower the LCT number in mg/m^3/min, the higher the toxicity. For example, even the non-lethal *CS* could kill, given a very high LCT of perhaps 11,000 mg/m^3/min. *Sacrim*, on the other hand, would be lethal at perhaps 100 mg/m^3/min. Effective dissemination of chemical agents is measured in kilogrammes per hectare (Kg/ha).

PROTECTION

Protection against chemical agents may be provided either by virtue of the construction of the vehicles or structures in which the troops move or live, or by means of pressure systems intended to keep the agrents out, or by special clothing worn by the indvidual. The heart of any personal system is the respirator: a device fitted with a carbon filter, often with additional chemical and physical additives, which provides protection against inhalation of all chemical agents. NATO protective clothing incorporates a filter barrier to protect the skin against blister and nerve agents. Warsaw Pact protective clothing is usually made of impermeable rubber. All protective clothing more or less impedes normal activities including the use of communications equipment. The clothing itself is non-proous, and hence uncomfortable to wear in hot weather and during exertion. Combat efficiency is therefore reduced during periods when troops are at risk of attack by chemical agents.

To be safe, troops must protect themselves before the agent attacks. Some form of early warning is essential. Detection of early types of agent was by smell, or by observing deployment of cylinders or the explosion of known chemical munitions. Specially designed electrochemical detectors are used against later agents.

After exposure to liquid chemical agents, men and equipment have to be decontaminated. Personal decontamination may be done by using an oxidizing agent like fuller's earth. Vehicles and equipment may be washed down with soapy water, bleach, or an ordinary water rinse. Nerve agents require special treatment but one immediate therapy, applied as soon as symptoms are recognized, is an injection of a mixture of trimedoxime, atropine, and benactyzine. (BAT/TAB and Nemicol-5 are, respectively, the NATO and Warsaw Pact standard-issue antidotes.)

MANUFACTURE

All countries with a spohisticated chemical industry could manufacture chemical agents, although special facilities might be required in order to produce and store chemical munitions. Many of the agents do not store for extended periods, and special handling and comprehensive safety precautions are mandatory. The US and the Soviet Union are the only nations which are known to have an existing chemcial agent bulk manufacturing capability.

USE

Chemical agents clearly have a psychological effect upon target troops, particularly those poorly trained in defensive measures. Effectiveness depends critically on climatic conditions—wind speed and direction, temperature, and temperature gradient. Field storage and handling require special precautions although this could be greatly eased by the recent US development of 'binary' munitions—in which the chemicals that combine to form the nerve agent are safely separated within the shell by a membrane, and are kept separated until the shell explodes.

As the accompanying table [table deleted] shows, delivery means range from aerosols carried on the person, through the larger calibre mortar bombs and virtually the fully range of artillery calibres, to rockets and aircraft with spray tanks. During hostilities, chemical agents would be used to inhibit defence, to make it impossible to occupy or to move through contaminated areas, to inhibit reinforcement, or to reduce the mobility of a marching force.

Stock levels of chemical weapons are impossible to assess, although reports sugest US holdings total 42,000 tons while claiming the USSR's stockpile to be 350,000 tons. Included in these figures is between 10 percent and 30 percent of the conventional artillery ammunition stocked. There is no clear evidence about the numbers of personnel involved in the respective chemical warfare (cw) programmes. The United States cites a total strength of cw-assigned personnel of 4,700 of which some 2,200 are with the field units and perhaps 2,500 are reservists. The Soviet Union and Warsaw Pact have Army specialist units from company level upwards, and various estimates of the total cw establishment range from 70,000 to over 100,000 men. Other NATO countries, such as the Federal Republic of Germany, also maintain cw specialist units, and most forces conduct some defensive cw training.

General RAPMUND. Sir, it is difficult to make a distinction between some biological toxins and chemical weapons on medical grounds.

Senator WARNER. That is a very important point and as it affects the individual. They are both equally serious.

General RAPMUND. Yes, sir.

General FULWYLER. Mr. Chairman, I would submit that to the soldier on the battlefield today it doesn't make any difference to him whether he is hit by biological or chemical. He is going to be dead.

Senator WARNER. Do we know why there is so much emphasis on biological in the 1972 Treaty, when the end result in terms of military usage is almost the same?

General BURKE. I have always assumed that it was because people were afraid that in dealing with living things it would get out of hand. You start building this in the laboratory. You might have this anthrax thing that we saw in the Soviet Union. Is that not true?

General FULWYLER. I would say that the living biological agent would be much more difficult to control than the chemical. (Toxins, on the other hand are not alive.)

Senator WARNER. After they are dispersed.

General FULWYLER. Yes, sir; even more henious than the chemical.

Senator WARNER. I see. What is puzzling to me is that if the Soviets are going to do this in Southeast Asia and Afghanistan that they just didn't go through this list and get rid of the treaty.

Senator WARNER. Mr. Gaspari, you were about to add something.

Mr. GASPARI. Mr. Chairman, in Southeast Asia the mycotoxin was the one thing we got physical evidence for and tested positively for, but there are other agents being used which are more the true chemical type agents which we have not acquired a positive sampling of, so one must not be misled into thinking that only the toxin was being used in Southeast Asia.

Senator **Warner**. As I understand, for the members of the committee and others, we are going to deal with, specifically, a week from today the whole subject of Southeast Asia.

Senator **Pryor**. Mr. Chairman, while you are on this point, and I think these questions are excellent—it is an area I have been confused about for a long time—may I ask the Doctor a question, or anyone—and this may have been discussed before I got here this morning.

What part of our stockpile is deteriorating? Is it the canister? Is it the chemical? What is deteriorating?

Senator **Warner**. I wonder if we might at this question just start with the Department of the Army, as your part of the presentation deal with the question and then go right into the Department of the Army's presentation.

DETERIORATING STOCKPILE

General **Fulwyler**. I talked a little bit about it, Senator Pryor, but I did not do it in the detail you want. But, just quickly, it is both the agent and the effect of the agent on the munitions themselves—both.

Senator **Pryor**. Now I know I am probably quoting someone here. You all have reason to take exception to Dr. Meselson from Harvard, your old adversary, but he maintains that there is not a deterioration of the agent.

General **Fulwyler**. I would ask him on what basis can he make that judgment. We sampled and have sampled the stockpile and I can tell you that it is deteriorating.

STATEMENT OF MAJ. GENERAL NILES J. FULWYLER, DIRECTOR, NUCLEAR AND CHEMICAL OFFICE OF THE DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS, DEPARTMENT OF THE ARMY

General **Fulwyler**. Mr. Chairman, I have a statement I prepared for submission, but at the same time I would like to give a summary of what is in the longer statement and get into a few things.

The reality today is that the U.S. Army must be unquestionably prepared to fight in a toxic chemical environment.

Senator **Warner**. I tell you what. Are you going to give the long statement?

General **Fulwyler**. Yes, sir.

Senator **Warner**. All right. We are going to put the full statement in. See which elements of your presentation have already been covered because this hearing this morning has gone for 3 hours, would you like to take a few minutes since yours is the longest and we could turn maybe to the Air Force for their presentation?

STATEMENT OF LT. GEN. KELLY BURKE, DEPUTY CHIEF OF STAFF (RESEARCH, DEVELOPMENT AND ACQUISITION) USAF

General Burke. All right, sir. I think I can summarize the Air Force presentation fairly shortly here. I might talk a little bit about what we are doing in the offensive area, the defensive area, and we might talk about what we have got now and what we are working toward.

In the offensive area, the Air Force can now deliver these chemical bombs that are in storage and we also have liquid dispenser canisters that were designed to go on the F-100 and [deleted] we are going to modity the F-4 so that can be done. That gives us a little incremental increase in capability.

Our new offensive weapons will be this Bigeye mentioned earlier. The Navy has the lead to develop the bomb. The Army has the lead to develop what goes in it, but the Air Force winds up buying most of them and procuring them. We are planning on buying [deleted] of those bombs between now and the last of the 1980's, at a cost of about $800 million, which is not a trival investment.

Questions were raised earlier about how you would get these delivered.

DELIVERING THE BINARY BOMB

Senator WARNER. That is the binary bomb.

GENERAL BURKE. This is the binary—the Bigeye. How one would get these delivered, and it occured to me after the question was asked that if delivery is a problem the B-1 would be an excellent device by which to deliver these, and in fact I calculated that eight B-1 sorties a day would deliver the entire stockpile of [deleted] from the United States over a [deleted] period. So that is an option we could go to. That is what we are doing in the offensive area.

Senator WARNER. How does the bomb operate? It is a high level explosion or can you choose a variety of scenarios?

GENERAL BURKE. The bomb divides the two agents, which are non-lethal separately, and just a few seconds before releasing the bomb from the cockpit the pilot triggers a device which then begins churning and mixing those. The bomb is released. It has a fuse set to go off at a predetermined altitude and that is done. Then the chemical is expelled from the canister by ram air and the gas pressure that builds up inside the bomb.

Senator WARNER. Where does the bomb fire—at altitude or when it hits the ground?

GENERAL BURKE. No, sir, you get better dispersion at a [deleted]. It depends on the winds—[deleted].

Senator WARNER. What sort of areas does this cover? What does it look like? Of course it depends on weather and winds.

GENERAL BURKE. Well, take [deleted] of those. Probably [deleted] of those would do a pretty good job on an air field.

Senator WARNER. [Deleted] of them would be required to put out an air field.

Senator PRYOR. [Deleted] bombs?

GENERAL BURKE. Yes, sir.

Senator PRYOR. How many bombs are you going to order?

GENERAL BURKE. [Deleted].

Senator PRYOR. Is that a classified number?

GENERAL BURKE. Yes, sir.

That is our part of the retaliatory procurement request.

Senator WARNER. What is the IOC of that?

General Burke. It is [deleted] I believe.

Admiral **Smedberg**. [Deleted].

Senator **Warner**. In [deleted] we will have [deleted].

General **Burke**. No, sir, that is the IOC. We complete the buy in the late 1980's. In 1989 we buy the last of them.

Senator **Warner**. That's the buyout. But they go operational to some units in [deleted].

General **Burke**. Yes, sir.

Senator **Exon**. Mr. Chairman, could I ask General Burke, is his statement not classified? Can it be released and talked about?

General **Burke**. Yes, sir.

Dr. **Wagner**. Senator, about 3 weeks ago we prepared a four or five page unclassified summary of everything we have talked about this morning which we have available.

Senator **Exon**. Not everything we talked about.

Mr. **Wagner**. An unclassified version that touches on most of the major points.

Senator **Warner**. Have you finished your presentation?

General **Burke**. No, sir. That was the retaliatory.

You asked what our capability is right now. We have a very limited capability both in Europe and the Pacific. We think we could not only survive but operate for [deleted]. All of our people in Europe and Korea have been issued three of these protective suits, one in which they train and two which they would use in actual combat. We are building toward a [deleted] capability and again we expect to attain that by [deleted].

PROTECTIVE EQUIPMENT

Senator Hart correctly pointed out there is a drop in our procurement dollars in 1982–83 that went from about $16 to $13 million for the Air Force in 1982–83, and that is because the equipment we have is not very good and we are on the threshold of getting ahold of much better equipment, so those numbers go up very sharply in 1984.

There is $31 million in 1984. By 1987 it is up to a quarter of a billion dollars to get our hands on that equipment. What we have now is not good.

As you know, an airfield is a highly integrated operation. In these protective equipment people have difficulty seeing, they have difficulty communicating. They lose their manual dexterity.

Senator **Warner**. What is the degradation? Can you quantify it as a man is 50 percent as capable, 20 percent as capable?

General **Burke**. I would say more like 15 or 20.

Senator **Warner**. Fifteen or twenty percent as capable.

General **Burke**. In the business of maintaining, arming, launching, flying an airplane.

Senator **Warner**. Somewhere around 10 or 15 percent as capable?

General **Burke**. Yes.

Senator **Warner**. A pilot can actually get in his seat and get crammed down into the cockpit.

General **Burke**. Just barely, and it entails sufficient risk that we don't like to do very much of that.

Senator **Warner**. Has each pilot tried it once?

General **Burke**. Yes, sir. We do it in the simulator and in actual flights but we have a lot of concern about bailing out or ejecting, so it imposes a terrible penalty on us. We can build those suits better and we are. We are looking at things like little forced air systems, which would just have a little tiny fan. That might solve the cooling problem. We train with this. We have full scale exercises. It will get better but probably not a whole lot.

We are working in the R. & D. area on better ways to detect the attack and better protective equipment for the individuals, also for collective protection. They have got to have an area where they can rest and recuperate and get back to work. And decontamination equipment as well. That is what we are doing in the defensive area, again a very substantial increase in our budget.

I would say by the end of the decade the Air Force will spend on the order of $2 billion in defensive equipment.

Senator **Warner**. The end of this decade, $2 billion?

General **Burke**. Yes, sir.

Senator **Warner**. And you hope to get out of the charcoal filtration and into some other options. Do you know what they might be now?

You mentioned the fans.

General **Burke**. Well, forced air not only helps keeping the body cool, it provides a positive pressure and just holds back the gas.

Senator **Warner**. You think you can put a canister of air in the suit somewhere under pressure?

General **Burke**. Well, of course in the airplane you have to plug into the normal oxygen system, which also would require modification. So it is a cumbersome, tedious proposition. We can improve it but we can't make it good.

Senator **Warner**. Have you tested your engines? Will they operate? Do you have reason to believe there is a problem there?

General **Burke**. The engines will operate but they will also contaminate. We have looked into things like Freon tanks so we would take a part and process them through there, and you have decontamination.

Senator **Warner**. What about your electronics?

General **Burke**. Again, you have to do the same thing.

Senator **Warner**. Well, let's just take, for instance, you encapsulated an F-4 and subject them to a measure of one of the Soviet chemical agents. Have you ever done that—the whole plane?

General **Burke**. No, we have not done that. We have simulated but not actually put a dangerous agent in it.

Senator **Warner**. Well, just to see what happens to the circuitry and navigation and all the other things.

General **Burke**. I do not think it will do much physically to the airplane or the equipment, but when the airplane comes back that somebody has got to go work on, he has either got to do that totally protected or you must purify the equipment.

Senator **Warner**. Well, I was just thinking that some of these blister agents and mustard—that will not affect—how that will affect the electronics.

General **Burke**. Well, probably the decontaminants will do more of a job than the contaminants and that is another job. You close the airplane down. Things that tend to decontaminate, they also tend to be corrosive, so we, as I said, will spend approximately $2 billion in this decade on defensive equipment which is a useful, desirable thing to do, but even if we spent $20 billion it would not deter Soviet use of this because the advantage is so with the offense and if perhaps 15 percent is the right number, we might get to 30 percent, but there is no way we are going to get to 100 percent. It is very important that we deter and I don't think defensives deter unless they impose such a price on the attacker that he just will not contemplate that attack and our defenses are not of that character.

We have got to deter that first attack.

Senator WARNER. You said [deleted]. How did you arrive at that figure and what did that mean for the time up to [deleted].

General BURKE. Well, hopefully you are no longer in a threatening period. You have come under attack and the wind has blown this away. If his response is [deleted] later to come back with another attack you are in trouble.

Senator WARNER. So the [deleted] is as long as an individual can operate in one of these suits on the ground and presumably in the air?

General BURKE. Yes, sir. [Deleted] we were just trying to balance out shortages and we were trying in the first step to get everything out for [deleted] for the pilots and the ground crew and so forth. We bought to that level. Now we are not trying to go from [deleted].

Senator WARNER. That was in terms of equipment, but about the individual himself? As I understand it, he can only function in that for, what is it, [deleted] and that is it?

General BURKE. No, sir, that is a variable, depending upon the heat and a lot of other things. [Deleted] is a very long time. I am sure General Fulwyler knows this better than I do. [Deleted] is a long time to be in one of those suits; if the temperature is even 80 degrees, it is intolerable.

General FULWYLER. In many places, and depending on the mission he is doing, the man will not last [deleted].

Senator WARNER. Well, in Europe, where the temperatures are 75 and 80 degree temperatures with dead air——

General BURKE. We did our testing at Hahn Air Force Base in Germany in October where the temperature is around 50 degrees. People were just incapacitated from body heat.

Senator WARNER. In what period of time?

General BURKE. [Deleted].

General FULWYLER. We conducted some tests, for example, in a tank and we started losing people at [deleted] in some cases. People by that time had lost several pounds of water.

RETROFITTING THE M-1

Senator PRYOR. Is the M-1 going to be retrofitted so it would survive nerve gas?

General FULWYLER. Yes, sir.

Senator PRYOR. How much is that going to cost?

General **Fulwyler**. I do not know the cost of that. The program for that is to start, as I recall, about 1985, in concert with when they refit the guns, as I recall.

There is a face mask now that provides protection, but there is no overpressure.

Senator **Warner**. Well, let's start with your presentation now.

ARMY CHEMICAL WEAPONS POSTURE PROGRAM

General **Fulwyler**. I will just talk in general terms about it. Our program encompasses about three complementary things. First of all, we want to enhance our defensive posture. Second, we feel that we have to provide a credible retaliatory capability. Third, we must simply get on with the task of coming together with how to demilitarize our stockpile, if necessary, to get rid of our current leaking munitions.

Shown here is our program. I have broken it down between defensive and retaliatory and you can see that—it is too bad that Senator Hart isn't here—as Secretary Perle mentioned we in the Army also have indicated a majority of our funds to the defensive side. Research and development is terribly important because, as I pointed out already, the current defensive items we already have are inadequate and we suffer in the Army, we believe, somewhere between 30- and 50-percent degradation if we have to operate in that posture for any length of time. That degradation is not just the individual. It is also on the unit as well.

Senator **Warner**. What percentage did you give?

General **Fulwyler**. I gave 30 to 50 percent.

Senator **Warner**. Why is there that difference?

General **Fulwyler**. Because there is a different mission.

General **Burke**. They can move.

Senator **Warner**. That is a good point.

General **Fulwyler**. Many of the jobs our soldiers have to do—and this is no reflection on the Air Force—but——

Senator **Warner**. Well, you say you can move. The Army's Pershing sites are still active. Basically there are lot of sites that are static, so you have a comparable degradation.

General **Fulwyler**. Yes, but I am just saying as a general rule I think the overall degradation is probably going to be at least 50 percent if we had to operate in a fully protected posture.

Senator **Warner**. Well, you say you move. You know, I can grasp that, but a lot of times you are pinned down. You are under fire. You are going to be under fire. There is artillery.

General **Fulwyler**. There are going to be many cases where—we try to practice and we try to teach in our doctrine what we refer to as contamination avoidance. That is, trying to find out what area is contaminated and get out of it as quickly as you can. Even with that set there are going to be instances and units that are not going to be able to do that. They are going to have to fight and survive in a contaminated environment and when they are forced to do that in a protected posture our degradation is significant.

Senator **Warner**. Have you done any psychological tests on this, because I have gone back and done a lot of reading of a lot of

World War I history and it is incredible the psychological problems. That seemed to be incredible in that conflict.

General FULWYLER. I do not know if we have done any psychological testing, but it is a phenomenon we are aware of. It affects different people differenty and there is a psychological impact when that individual puts on all of that stuff and has to wear it for any length of time. But maybe the doctor can address that.

General RAPMUND. The best defense against the psychological effect of wearing the protective clothing and operating in a chemical environment is training. It is to understand what the limitations are and to know what the adversary is. We feel at the moment we do not need to undertake a big research program on the psychological impact. It is very clearly there from history.

Senator WARNER. You have studied some of the history?

General RAPMUND. Yes, sir. And it is like a medical diagnosis. If the diagnosis is unknown it is pretty frightening, but if the diagnosis is known then you know exactly what you have to deal with.

Senator WARNER. Well, my father was a doctor in the trenches in World War I and I can remember the stories he told me about the gas attacks and that is one of the reasons I got into this thing.

Senator PRYOR. I think Adolph Hitler was subjected to mustard gas in World War I.

General RAPMUND. Either that or chlorine, one or the other.

Senator WARNER. Go ahead, General.

General FULWYLER. Well, you can see that our emphasis is on the defensive side.

Senator WARNER. Well, that R.D.T. & E., that 35, part of that is retaliatory, so that might take it down. You have got R.D.T. & E. We are making a big to-do about how 75 percent of it is defensive, 26 percent or whatever it is. That R.D.T. & E. could be subdivided and a part of that R.D.T. for retaliatory; isn't it?

General FULWYLER. No, sir. We have a separate R.D.T. & E. over in the retaliatory end and that is what is shown over there as $22 million.

Senator WARNER. So within the 26 that is subdivided. I stand corrected.

General FULWYLER. Yes, sir, and that part is dedicated toward retaliatory. This part over here is purely on the defensive side and you can see what we are trying to do both in the defensive side and on the retaliatory side.

STOCKPILING

Now let me just talk briefly, then, about the stockpile. If I could have the stockpile chart. This is of concern. We hear frequently that we have enough and our current stockpile is not all that bad. Now this is a slide that tries to break out the status of that stockpile.

First of all, let's go to ready-for-issue munitions. You can see where the locations are. The total we have today is a little over [deleted]. Now we have an additional [deleted] down here which are repairable, and by "repairable" I mean that we either have to go up and upload munitions and put bursters in it or we have to make some modification or some preparation of the projectile itself before we can start doing the first of those, and we estimate somewhere at [deleted].

Senator WARNER. Repairable. I wonder if that is the right word, because when I went out to Toole they were taking the 155 and putting the burster in, so that wasn't repairing.

General FULWYLER. No; that was upgrading.

Senator WARNER. So upgrading is within the term repairable?

General FULWYLER. Yes; as we say, they are either ready for issue or can be made ready for issue. Again, we are talking probably [deleted] before we could get any of those coming off the line.

Senator WARNER. So from day one there is a [deleted] delay before the first unit under that category is available.

General FULWYLER. We have to work on our field line or the production facilities before we can do that.

Then you see where we have a great majority of our stockpile. It is in the bulk agent.

Senator WARNER. Excuse me, go ahead.

General FULWYLER. You can see the great part of our stockpile is in the bulk agent. There again we can use that bulk agent for certain things, but remember how much of it is mustard agent. That is World War I type of mustard agent, mustard agent that freezes at 58 degrees. Visualizing where we might have to use this you can see it doesn't offer much utility for the European environment. Now even if we wanted to use some of that bulk agent, we have to have fill lines to do that.

It would take a long period of time to get the fill lines back into operation.

Senator WARNER. All right. What about the time required to upload the bulk agent? I have got it firmly in mind that category 2 is [deleted]. What about bulk category?

General FULWYLER. Probably a [deleted] to get the fill line ready. That is the minimum.

STATUS OF STOCKPILE

So we look at the status of the stockpile today. We have a little over [deleted] ready now. The point I would make here also is that we know that this agent is deteriorating either that and/or the munition that it is encased in. So that if we don't do anything with this stockpile, it is going to continue to be reduced each day, each year, to such a point that by the end of this decade, which I believe Secretary Perle or Dr. Wagner mentioned, we are going to be down to one-third of the stockpile that would be useful—less than one-third.

So that was the message that we simply must do something to modernize this stockpile, whether we do it with binary or whatever. We simply have a requirement to modernize and provide a credible capability.

Now in closing, let me just——

Senator WARNER. Let me go back to the previous chart and ask you a question submitted to me by staff. The question is, you show the [deleted], stockpile having [deleted], all in serviceable form.

General FULWYLER. Yes, sir. [Deleted.]

Senator WARNER. The committee has an Army document showing [deleted] as being unserviceable.

General FULWYLER. That is probably an outdated information. We started about 2½ years ago a maintenance program to make all of those munitions serviceable. That program is due to be completed next month and at that time we should have all of these, except for a few leakers, we should have all of that serviceable.

Now the point to remember there, Mr. Chairman, is we are [deleted].

Senator WARNER. All right.

General FULWYLER. Let me just, in closing, hit what I call some of our frequently termed myths about the requirement for CW. The first one is that we talked on briefly this morning, that we don't need the retaliatory capability; we can rely on nuclear weapons. Again, that is a myth because when one looks at what the balance in the strategic and the threater nuclear force area is today, I think one can conclude that it would be—that it does not constitute a credible deterrent for us to rely on nuclear to counter the use of CW against.

Interestingly enough, too, those who would say use nuclear as the deterrent are the same ones that are concerned about lowering the nuclear threshold, but I maintain that having no alternative but to go nuclear if they use chemical against us is lowering the nuclear threshold.

There is another one that says that defense is enough.

Senator WARNER. It forces us to the nuclear option more quickly and that then lowers the nuclear threshold.

General FULWYLER. We would be facing that decision sooner than we would otherwise; yes, sir.

Senator WARNER. Now this is a fairly dramatic statement. What is the classification of this subject?

General FULWYLER. I think you can make the generalized statement.

Senator WARNER. The options of a CW deterrent capability in the allied forces presses us to the use of nuclear weapons at an earlier stage in any conflict.

General FULWYLER. It would certainly force us to consider the use of nuclear conflict.

Dr. WAGNER. I think the way you said it is unclassified.

Senator WARNER. Is that out there churning around in the public domain?

Dr. WAGNER. I don't think so.

DETERRING SOVIET USE OF CHEMICAL WEAPONS

General BURKE. We have said publicly in years gone by that we intended to deter Soviet use of chemical warfare in central Europe by threatening the use of nuclear forces. That probably made sense 10 or 20 years ago, but we are on the short end of that stick.

Senator WARNER. Well, we are dealing here, gentlemen, with a very sensitive public relations problem. This issue, in my humble judgment, is going to get caught up in the backwash of this nuclear freeze thing. It is another car hooked to the train and I want to be very cautious in public statements not to get things into an inferno here, but at the same time to adequately inform the general public and my colleagues of the seriousness of this problem.

So my articulation of this nuclear option situation is an accurate one and within the confines of what we are here discussing.

Mr. PERLE. Senator, I would be a little bit careful of a formulation that could be misinterpreted as suggesting that unless our NATO allies agree to chemical weapons on their territory we would think it necessary to employ nuclear weapons earlier if that conveys the sense that we are pressuring them to accept those weapons, because we haven't even approached them yet with a view to forward deployment.

Senator WARNER. Well, I think that in any public statement I would make I would not try to involve the allies other than to state that I am deeply concerned about their perhaps lack of a full appreciation of the potential of the Soviet capability, and I recognize the delicacy of what you say, but it seems to me that with our U.S. forces overseas and defending the people that we have there, our commanders are pushed to an earlier threshold in use of nuclear weapons if in fact the Soviets use on a massive scale the chemical ones.

Mr. PERLE. I think that is a perfectly fair statement.

Senator WARNER. All right.

General FULWYLER. And the idea that if we provide all of our forces with adequate defensive equipment that we will not have to have a retaliatory capability, that is simply wrong, because of the degradation problem that General Burke and I have just discussed. I think that idea is preposterous.

Senator WARNER. On that point, let's talk tactics a minute. Again, my tactics are World War II and Korea, but you take a line of troops and you are in a formation. Most of the European scenarios are the Soviets, if they initiate the attack—which of course would be the only circumstances in which we fight—we are in a retrograde of some type in our movement to consolidate until we begin to bring up support troops, and so forth.

So it is a motion to the rear, generally speaking. If they were to throw these weapons, at what point in time do they have to put on their suits and thereby suffer some comparable degradation of their capabilities along the lines of your 30 to 50 percent?

Of course their pilots—let's take the airfield. If they hit one of your strips and you are out there operating with those suits on, that doesn't limit their aircraft coming in. They don't have to wear their suits. They do not have to do a thing. They can come right down and put some more suppressing fire on that field. They can do that quickly, can't they?

General BURKE. Yes.

Senator WARNER. So they do not have that degradation.

General BURKE. No.

Senator WARNER. Now let's take an Army situation.

General FULWYLER. Again, it would depend on where they were delivering those munitions. I do not visualize using all those weapons on the forward edge of the battle area. I think it will be hitting deeper targets to delay, disrupt, and deny certain key terrain, the airfields, the storage sites.

Senator WARNER. Selective use.

COMMUNICATION AND IDENTIFICATION CHAOS

General FULWYLER. So if they start using them they will be massed and they will be coming on through. A very interesting thing that we have not brought out in relationship to the degradation is the difficulty in communication, identification, or units and anything else once you put these things on. Can you imagine how difficult it will be to try to control a group of soldiers on a battlefield who are all fully masked in protective garb? Communications from the leaders to the soldiers, for example, would be an enormous problem.

Senator WARNER. What is it? I do not know.

Can you hear in the suits?

General FULWYLER. You can only hear muffled. The distance that you can hear command and control is very limited and when you are looking at all the backs or across in front of the soldier you cannot identify the leader, the noncommissioned officer, from anyone else. Each man is a problem of command and control on the battlefield.

Mr. PERLE. Senator, the effectiveness in chemical weapons is greatly multiplied when used in conjunction with conventional weapons. To give you one example, I had occasion a year and a half or so ago——

Senator WARNER. Now let's watch that. That's a very important statement. The effectiveness of the chemical is multiplied or the effect of the conventional is multiplied, or is it both?

Mr. PERLE. There is a synergistic effect. For example, if the object of the attack is an airfield, the chemical weapon—a precursor chemical weapon on that airfield can render ineffective the air defense necessary to protect the field from subsequent attack from the air.

A year and a half or so ago I participated in a war game at the Naval War College. One of the first events in that war game was an attack on [deleted].

[Deleted.] The possibilities are obviously very large for the discrete use of chemical weapons in conjunction with other capabilities, both to suppress offenses, or, in the case of [deleted].

Dr. GOLD. Or to suppress the repair, again in the synergistic effect. Again, if they are using conventional munitions to dig up holes in the runway, just imagine the extra burden on our repair crews if they have to operate in full protective gear in a contaminated environment.

Senator WARNER. The chemical is a massive multiplier when it is used by the attacker. Massive may not be the word. Somebody said it is [deleted]. What is it.

Mr. PERLE. Well, with respect to something like air defense, the multiplier is enormous. If you lose those defenses you are probably going to lose the base.

Senator WARNER. Good point. General Fulwyler?

General FULWYLER. Senator, all I can say is I think we delayed already far too long in obtaining a credible retaliatory capability and I think we owe our fighting men to provide them something to assure they never have to live and fight in that environment and a credible retaliatory capability is the only way on Earth to insure that.

Thank you.

Senator **Warner**. Thank you, General. Admiral.

STATEMENT OF REAR ADM. WILLIAM R. SMEDBERG, DIRECTOR, OFFICE OF NAVAL WARFARE, DEPARTMENT OF THE NAVY

Admiral **Smedberg**. Mr. Chairman, I merely note at this point in time that the Navy agrees fully with the thrust of what the Defense Department program is embarked upon and indeed with the comments of the Army and the Air Force.

We perhaps have some rather unique requirements from our setting at sea and therefore we cannot use, lock, stock, and barrel, everything that the other services are using. Ergo, we have programs in some slight variations on R. & D. to provide protective defensive systems and that sort of business, and I would just touch on those right now in a shortened review of my statement.

LACKING ADEQUATE CAPABILITY IN CHEMICAL ENVIRONMENT

We recognize that today we certainly lack an adequate capability to survive in a chemical environment should we anticipate ourselves getting in one. As I mentioned earlier, certainly we recognize that the Soviets have the capability to impose the chemical warfare environment, particularly in the scenario of amphibious operations when we are close to the enemy literals and that goes to the extent not only on the amphibious forces and the ship-to-shore objective area, indeed even the area of our supporting forces in that area.

They certainly have the range to be able to engage the naval forces. We have not done much in the past with respect to outfitting our people to be able to operate in that environment. Indeed, our previous policy has been to have essentially [deleted].

We have taken a good hard look at that, recognized we need far more than that, recognized that we need more shipboard detection. We need much more detections systems per se. [Deleted.] We have adapted an Army detection system, a point detection system, to tell if there is a chemical present. [Deleted] so we are working on that like the dickens to provide a better capability for our ships.

Senator **Warner**. Is that classified?

Admiral **Smedberg**. The fact that we are working on it, I don't think is classified.

Senator **Warner**. [Deleted.]

Admiral **Smedberg**. I think that ought to be classified.

General **Fulwyler**. Because of operational security, sir, I would say that should be classified.

Senator **Warner**. What about the fact that we have [deleted] a percentage of the people aboard a ship able to go out and work in a chemical environment? As I am sitting here listening, [deleted]. I mean, I can see how certain types of Badgers and Bears could lay down a chemical barrage over a task group.

Admiral **Smedberg**. Yes, sir. I have a feeling it is a little more difficult just because they have to know precisely where the winds are and that sort of business in order to do that.

Senator **Warner**. If you sail through a big cloud of chemical stuff and your intakes are pumping.

Admiral **Smedberg**. Yes, sir. If they do that we are in trouble and that is the reason we are exploring not just the individual protective systems but the detectors, not just the protectors, the suits, but the detectors themselves and also you will recall years ago we started working on a collective protection system or Citadel-type system for our ships.

About the time you were Secretary, as a matter of fact, we were——

Senator **Warner**. Don't lay this on my watch.

Admiral **Smedberg**. No, sir. As a matter of fact, the experimentation was good. We developed a capability, although at some expense, to be able to protect the ships with overpressure inside so that things do not seep in. We are now redoing that again with the first program on one of our LHA's and not all of it, I might add, but just [deleted] zones of it, to put this in.

Senator **Warner**. [Deleted.]

Admiral **Smedber**. Yes, sir.

Senator **Warner**. We all know, and I do not know what the various scenarios in which the attack is deployed, but [deleted].

Admiral **Smedberg**. That is exactly right, sir.

Senator **Warner**. Because the big carriers with those open decks and those spaces below cannot be sealed in with overpressure.

Admiral **Smedberg**. Exactly right.

In any event, we are attempting to correct those sorts of deficiencies and that in fact is the status of our program, which runs up to $0.5 billion, essentially, as we can foresee going through the years.

Senator **Warner**. And where are you?

Admiral **Smedberg**. Right now the total defensive and offensive program is about $350 million in the Navy.

Senator **Warner**. Over what period?

Admiral **Smedberg**. That is over the 5-year program as we see it, but we need to go out beyond that as well.

Interestingly, our profile percentagewise is a little bit different because, as you know, we are the agency for developing the bomb itself, the Bigeye, so we look like we are heavy on the retaliatory side as opposed to the defensive side. The fact of the matter is, as we develop and get through with the R. & D. for the Bigeye, then the Bigeye program stays at about $25 million per year and defensive measures go up and in fact become the largest portion of our Navy program.

I only wanted to note that our priorities I think quite naturally go to the amphibious forces first, that I could not add much to what has been said with respect to the offensive capability that resides totally in our development of the binary Bigeye weapons system.

I would add that there are some constraints right now with respect to carrying chemical weapons onboard ship. We are not permitted by law to do that. That does not mean that they could not be waived.

Senator **Warner**. What is the origin of that law? What year?

Captain **Doyle**. Sir, may I make a correction? That is not a law. It is a navy policy.

Admiral SMEDBERG. It is a policy because of the leakage.

Senator WARNER. When was that put in?

Captain DOYLE. March 13, 1978, sir.

Senator WARNER. [Deleted.]

Admiral SMEDBERG. That is correct. Now that does not mean that the Navy does not. The Marine arm of the Navy, although not when they are sea-based, has the capability of carrying munitions and indeed the Marines would be counted on to do that in that amphibious——

Senator WARNER. You can be sure if the Army has got anything to do about it, the Marine Corps has got the leaky ones—pardon the pun, gentlemen.

When I was in the Corps we had too much of your old used stuff, but anyway continue Admiral, before we cruise out. [Laughter.]

SOVIET NAVY AND THEIR CAPABILITIES

What do we know about the Soviet Navy and their capabilities?

Admiral SMEDBERG. All of our estimates say they have the capability of putting chemical warheads on almost all of their tactical weapons, whether they are air-to-surface, or surface-to-surface munitions. We see evidence of their having the chemicals near the piers and storage places so we think they have the capability to do this.

Senator WARNER. And they can button up pretty well, is my recollection.

Admiral SMEDBERG. Oh, yes, sir. And their ships indeed are built with much better protection from the start than we have built our ships.

I might add that all of our new construction ships have good criteria.

Senator WARNER. We should have gotten started on those decontamination systems.

Admiral SMEDBERG. A long time ago.

Senator WARNER. All right.

Admiral SMEDBERG. I would only summarize, Mr. Chairman, by saying that we think that both the enhancement of our defensive capabilities and the continuation of providing retaliatory capability are very necessary and important for the Navy as well as the other services and our program intends to do that.

Senator WARNER. That is a good point. The binary would certainly enhance your safety threshold so it could be deployed at sea.

Admiral SMEDBERG. Yes, sir.

Senator WARNER. Well, these gentlemen have got to have a little break. First I would like to observe that the hearing has perhaps been somewhat informal but somehow I feel under certain circumstances you can conduct a better hearing with less formality and let people ask questions at different times, somewhat unrestrained. At least I feel we put together a good record.

Before we adjourn this session, I will open up the opportunity to anyone in the room to make some observation or a point that we may consider pertinent to this hearing and that the record should include. Does anyone care to supplement?

Mr. **Singdahl**. I fought with the infantry in World War II and have seen and had a good friend step in front of me and get his belly ripped open with shrapnel. We were pinned down for a couple or 3 hours at that point in time and based on my knowledge of what nerve gas will do to you as opposed to what conventional weapons will do, I will take the nerve gas any time—not that I want either one.

However, when we talk and in our dealing with the public, on these heinous weapons and how terrible they are, they are sinister and they are misunderstood, but we actually use hydrogen cyanide to put away people in this country. We kill them in our criminal system, people that have been convicted of crimes.

So I think it is a question of kind of educating the people also to get out of the minds of the public that these are not—in other words, that is a humane way of killing you if you are going to kill anybody and it is much less painful and troublesome than it is to get your legs blown off and your belly ripped open with shrapnel.

Senator **Warner**. Well, I have very modest amount of that experience myself and we used to sit there when they were coming and say that one does not have my name on it. And true in the adjacent bunkers some of the fellows went up and here I am, but boy when that chemical comes in, when that gas begins to roll down the draw toward you, I tell you, I think you will separate the heros from the others.

Well, I don't know, gentlemen. It is a very mystifying thing, I do know one thing. This country has got to move in the direction that we are trying to achieve now with this budget, and that is barely a beginning.

Any other observations?

Well, we go into an open session at 2 p.m. in room 212 Russell and we will go through cryptic versions of what we have covered to date. The chairman has always felt that we have a responsibility to let the general public and my colleagues in the Senate—the Senators do not have a chance to study it, so let's do what we can to make it a very strong case.

Mr. Secretary?

Mr. **Perle**. I just wanted to get on the record the appreciation that we have, Senator, for your leadership in this. I think it is perfectly clear that on those difficult and controversial issues if there is no one in the Congress who is prepared to stand up and lead the fight we cannot get the programs through. You have done that and we are very grateful.

Senator **Warner**. Thank you, Mr. Secretary, for your remarks and your assistance in compiling this helpful record.

[Whereupon at 1:18 p.m., the hearing recessed, to reconvene in open session at 2 p.m. in room 212 Russell Senate Office Building on the same day.]

OPEN SESSION

The subcommittee met, pursuant to notice, at 2:08 p.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Nunn, Hart, and Pryor.

Staff present: Frank J. Gaffney, professional staff member; Paul C. Besozzi, minority counsel; Christine E. Cowart, chief clerk; George K. Johnson, Jr., and James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; George Kohl, assistant to Senator Humphrey; Jim Dykstra, assistant to Senator Cohen; Paul Schreiber, assistant to Senator Denton.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. The Subcommittee on Strategic and Theater Nuclear Forces also has jurisdiction over the element of the President's Department of Defense budget which deals with chemical warfare.

The subcommittee convened this morning shortly after 9 and continued in closed session until after 1:00 today, at which time we broke for a quick lunch, to resume again this afternoon. The primary purpose of this afternoon's session is to be able to put in open testimony both in the Senate, of course, and in the public domain as much information as possible to support the President's budgetary request.

The Chair has spent a good deal of time in studying this issue. I accept the responsibility on behalf of the Armed Services Committee, the majority and the chairman, to undertake this difficult task. It is certainly not one that anyone would undertake by choice, but in my judgment it is essential to the immediate and long-term national defense of this country that this issue be addressed openly and fully and that we proceed with a program to rectify the military imbalance which has been allowed to develop in this area of warfare.

I think it is unfair to the men and women in uniform today, particularly those who are in the far-flung outposts and in NATO, that we lack as a Nation a credible deterrent should they be confronted with an attack by the Soviet Union in which chemical warfare was employed. We would be at a severe disadvantage.

We will bring out in testimony today that our commanders, from those in the field to the President of the United States, would be faced with a very early decision as to whether to resort to some type of nuclear retaliation to overcome the very substantial advantage that the Soviet attacker would have utilizing CW.

In testimony this morning, the Army said that the soldier in the field would be degraded in his ability anywhere from 50 to 60 percent. In the Air Force, a typical base in Europe, the degradation would be somewhere between 80 and 90 percent. Should elements of the U.S. Navy be confronted with CW, in all probability they would be required to leave the scene as quickly as possible.

Compounding this problem is the deteriorating inventory of weapons here in the United States, to the point where it is unfair to ask our military personnel to continue the handling of that inventory, and it is to some extent dangerous to the civilian population through which we would have to pass to transport any of these munitions.

With that background, I will put the opening statement that has been prepared in the record and call on Secretary Perle to commence the hearing.

[The prepared statement follows:]

PREPARED STATEMENT BY SENATOR JOHN W. WARNER

Today the Senate Armed Services Committee has begun a comprehensive set of hearings on the subject of chemical warfare. Beginning this morning with a detailed, classified review of the Soviet Union's chemical warfighting capabilities and a discussion of the preparedness of the United States and its Armed Forces to deter and be protected against the use of these horrible weapons, we expect to develop, for the use of the Senate and the American public, a full and thorough record on this subject.

In so doing, we are continuing the careful consideration of chemical warfare matters undertaken by this Committee in 1980 and 1981. This subject has taken on additional urgency and received increasing public attention as a result of two separate, but related, developments in recent months: The mounting evidence of Soviet- and Soviet-proxy use of chemical agents in combat operations taking place in Southwest and Southeast Asia, and the submission to Congress by the Reagan Administration of a program for modernizing the U.S. chemical deterrent.

In light of these developments, it is incumbent upon this Committee to develop a detailed and complete record that will be available to all Members to assist them in making decisions on the budget request and related matters. The Subcommittee has made a concerted effort in all its hearings to date to conduct them, to the degree it is feasible to do so, in unclassified session.

It is in that spirit, that we have asked the witnesses who have appeared before us this morning in executive session, to continue their testimony on the Soviet Union's chemical capabilities and America's chemical deterrent posture with a discussion in this open forum. We are delighted that Mr. Richard Perle, Assistant Secretary of Defense for International Security Policy and Dr. Richard Wagner, Assistant to the Secretary of Defense for Atomic Energy and chemical matters agreed to try to make as much information concerning the need for the President's chemical preparedness program, available to the public, recognizing that much of the detailed data is sensitive and must remain classified.

We are also pleased to have representatives from the three Services here to continue the sobering discussion we had this morning. Major Niles Fulwyler of the Army, Rear Admiral William Smedberg of the Navy and Lieutenant General Kelly Burke of the Air Force will continue, I hope, to provide the Committee with their candid views on the readiness of American forces to withstand an attack employing chemical weapons and the importance of maintaining a credible deterrent to such attacks.

In closing, let me reiterate that there are few issues that will be addressed by the Congress this year that may have as profound an effect upon our national security as will the outcome of our deliberations on President Reagan's program for chemical preparedness. I look forward to a free and frank discussion of the issues involved in this program both this afternoon and in subsequent hearings planned by the Chair concerning the issue of Soviet- and Soviet-proxy use of chemical weaponry in Asia and a discussion among distinguished, non-governmental experts on the many troubling aspects of the threat of chemical warfare.

STATEMENT OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE, INTERNATIONAL SECURITY POLICY

Mr. PERLE. Thank you very much, Mr. Chairman. I am pleased to have this opportunity to appear before you today to support the administration's program to deter the use of chemical warfare. That is the essential and underlying purpose of the program the administration has proposed to modernize our capability to bring chemical weapons to bear.

Chemical weapons modernization is not an end in itself. It is a part of a larger effort by this administration to prevent the further deterioration of our military strength, an effort that encompasses programs in a number of other areas as well. Our purpose is simple. It is to assure that chemical weapons will not be used against the United States and its allies.

The administration's ultimate goal with respect to chemical warfare is a complete and verifiable ban on the development, production, and stockpiling of chemical weapons. Our best hope of achieving such a goal lies in our effort through negotiations in the Committee on Disarmament, where multilateral talks are under way.

I think we should recognize that it would take time to achieve that objective, perhaps a number of years, and we will not succeed in achieving it unless we have a meaningful chemical weapons capability of our own. As we seek to achieve a complete and verifiable ban, it is essential that the United States acquire some sensible level of insurance against the use of chemical weapons through the modernization program we are now proposing and which I am glad to have an opportunity to discuss.

I believe we need to persuade the Soviet Union that it is in the Soviet interest to negotiate seriously about chemical warfare and to face up to the difficult issues of verification and compliance that they have thus far been unwilling seriously to address. Our best chance in breaking down the wall that the Soviets have erected to the achievement of such an agreement lies in a modernization program of our own, because I think it is clear that our own inferior posture in this area has made it difficult to get negotiations to the point where there is a prospect of their succeeding.

For a number of years the United States has unilaterally exercised restraint in this area by deferring the modernization of its own chemical weapons program. We cannot expect the Soviets to take a serious interest if we do not improve our own capabilities.

Senator WARNER. On that issue, I have done a little research and I determined that the Joint Chiefs of Staff recommended, I think, six times during the past 8 years that we initiate a program comparable to the one in this budget. And each time it was turned back by the political leadership, presumably the Secretary of Defense acting on instructions of the President.

What is the accuracy of that statement? And if not, would you put it in the record? Who has a recollection?

Mr. PERLE. Senator, I do not recall the frequency with which proposals were made.

General BURKE. It has been a number of times and that sounds about right to me.

Senator WARNER. Does anyone else have a clear recollection? Many times the uniformed side of the Department of Defense has recommended it and the civilians have declined to incorporate it in the budget, is that not right?

Mr. PERLE. I believe that is correct.

Senator, as you are aware, the United States is party to two treaties which affect chemical and biological warfare. The first is the Geneva Protocol of 1925, which prohibits the use in war of asphyxiating, poisonous or other gases and of bacteriological methods of warfare. This has come to be viewed generally as a no first use agreement, since a number of countries, including the United States, have entered reservations to the protocol allowing chemical use under certain specified conditions. In our case, we have reserved the right to retaliate with chemical weapons against any enemy state whose armed forces or allies do not observe the provisions of the protocol.

The second treaty is the Bacteriological and Toxin Weapons Convention, which prohibits the development, production, and stockpiling of biological or toxin weapons. Toxins are prohibited regardless of their origin or method of manufacture.

Consistent with these two treaties, the United States will not use chemical weapons unless they are first used against us or our allies, and the United States does not and will not under any circumstances acquire or use biological or toxin weapons.

During the preceding decade, the United States has demonstrated restraint and willingness to obtain a complete, verifiable chemical weapons ban by refraining from producing and filling lethal or incapacitating chemical weapons. In 1969 the United States unilaterally renounced biological and toxin warfare. This was some time before the convention prohibiting the use of biological and toxins was negotiated.

While we unilaterally restrained our chemical capabilities, the United States made major efforts in the late 1970's to do away with the problem by reaching an agreement with the Soviets on a comprehensive and verifiable ban on chemical weapons. Verification of such a ban is a complex and difficult problem. The effort to achieve——

Senator WARNER. On that point of verification, any more so than with the biological weaponry? And what happened under that earlier treaty with the biological with respect to verification?

AGREEMENT NOT VERIFIED

Mr. PERLE. Senator, we entered into the agreement on biological weapons with the knowledge that that agreement is not verifiable.

Senator WARNER. So that is not a verifiable treaty?

Mr. PERLE. That is correct.

Senator WARNER. We have the same problem were we to consider a treaty covering chemical weapons, then.

Mr. PERLE. A treaty covering chemical weapons that did not provide for verification would be very much like the biological weapons convention, which is not verifiable. And I think we have learned, to our regret, that unverifiable agreements are sometimes violated, and I believe the evidence is persuasive that the Soviets have in fact violated the biological weapons convention.

Senator WARNER. In what areas of the world and when?

Mr. PERLE. In Southeast Asia, and we believe it is going on right this moment.

Senator WARNER. Possibly Afghanistan?

Mr. PERLE. Possibly Afghanistan.

Senator WARNER. Do you think these treaties are inherently verifiable by any means other than onsite inspection?

Mr. PERLE. I believe that we can only achieve reasonable assurance of compliance if we have access to the facilities in the Soviet Union where these agents are manufactured, where the weapons are manufactured, where the agents are stored and so on. The verification problem, as you will appreciate, is a good deal more difficult than say with respect to launchers for their strategic missiles.

Senator WARNER. Well, the national technical means just do not lend themselves to verification of this type of inventory of weapons and training.

Mr. PERLE. That is correct, and it is in fact in part because of what we have seen in Southeast Asia that we are even more acutely conscious than we were before of the need to achieve arrangements as part of the treaty that provide adequate verification. As I say, we have been unable to do that.

In particular, Soviet resistance to even the concept of onsite inspection has frustrated our efforts to negotiate a verifiable treaty. For obvious reasons, a treaty that is inadequately verifiable is unacceptable to the United States.

Negotiations with the Soviets have been further complicated by our weak posture in this area compared to the Soviets. The Soviets have little incentive to come to an agreement, and indeed they have not. They are interested in negotiations, however, and it has been our experience in this as in other areas that the Soviets are often prepared to negotiate, endlessly if necessary, but one cannot infer from a willingness to negotiate a willingness to come to an agreement and certainly not a willingness to come to a verifiable one.

COMPLETE CHEMICAL WEAPONS BAN UNSUCCESSFUL

The lack of success in obtaining a complete and verifiable chemical weapons ban has led us, unhappily, to the conclusion that we must continue to depend on the deterrance of chemical warfare. Let me take a moment to talk about our modernization program in the context of our alliance relationships. We have kept our allies informed about our thinking on these matters, about our modernization program.

Senator WARNER. Against that background, first to set the stage, we are the only member of the NATO organization that today possesses any capable—I mean, deterent capability, is that correct?

Mr. PERLE. That is correct, Senator. The French have a program, but they are not integrated into the NATO military structure.

Senator WARNER. The other NATO nations, however, do have some defensive capability.

ADVANCED ALLIED DEFENSE CAPABILITIES

Mr. PERLE. Indeed they do, and in some cases the defense capabilities of our allies are further advanced than our own.

Our allies are aware of our plans to modernize our chemical retaliatory capability and of course they are very much aware of the defensive measures that we are now undertaking. While making it clear that we are proceeding on these programs, we have also made it clear that the decision to modernize U.S. chemical weapons capability is a decision that lies with the United States alone. For that reason, we have believed it inappropriate to ask our allies to share responsibility for this decision, and we have not asked them to do so.

As you know, at present our own program involves development and production only. Of course, we will keep allied views on the subject of development clearly in mind if and when such deployment involving our allies should become necessary or desirable. And it goes without saying that we will consult with those allies who may be affected before the United States makes any decision concerning the climate abroad, in Europe in particular.

Senator **Warner**. On that point, Secretary Perle, I think we should clearly state that, while our major focus of attention is in the European theater, particularly the history of World War I and the use of these weapons, the U.S. forces are deployed worldwide and have been engaged in minor or to some extent major military operations many times.

U.S. NEED FOR BINARY SYSTEM

As such, when we examine the need for binary system in the U.S. inventory, while we should properly focus upon NATO, indeed there are many other scenarios where these weapons might be necessary because, based on the experience in Southeast Asia and Afghanistan, chemical weaponry of one form or another, or biological or both, has fallen into the hands of nations other than the Soviet Union.

Mr. **Perle**. That is correct, and always nations, in the recent past, in association with the Soviet Union.

But the problem is indeed a worldwide problem, and we single out Europe only because of the abundant evidence that the Soviet Union maintains chemical weapons of its own oriented toward the European theater.

Senator **Warner**. Yes. But time and time again the individuals—and I respect the critics of this program—say that we should not be making these weapons, because it further exacerbates the relationship with our allies. And at the present time we have no means by which to deploy these weapons in the European theater.

And I have to remind such critics that our military pacts involve us worldwide.

Mr. **Perle**. That is correct, sir.

As a practical matter of timing, let me stress that actual production of the modernized weapons the administration is proposing is 2 years away, and it will be some time after that before U.S. stocks will be sufficient to warrant consideration of forward deployment abroad. So we are some time away from those decisions. Consequently, for this reason as well, deployment discussions with our allies now or in the immediate future would be premature and we do not contemplate them.

CHEMICAL RETALIATORY CAPABILITIES

We recognize, of course, that our plan to improve our chemical retaliatory capabilities will be controversial overseas and will provide a fruitful field for Soviet propaganda and other critics. We believe that a clear explanation of the threat, our program objective, which is deterrence, and our overall program emphasis, which is defensive in nature, will allow the United States and eventually its allies to manage this issue in a sensible fashion.

Everything we know about the Soviet Union in this field impresses us with the depth of their commitment to chemical weapons and the breadth of their deployment, training, exercising, experimentation, research and development, and the like. We believe therefore, Senator, that our chemical modernization program is essential to our national interest and entirely consistent with our efforts to achieve our preferred method of dealing with this problem, which is to bring about an agreement that would free the world of weapons of this nature.

That concludes my opening statement and I will be happy to respond to any questions you may have.

Senator **Warner**. Let me just make a few observations with regard to some of the testimony we heard this morning, and I will take upon myself the responsibility to declassify, if necessary, these observations.

SOVIET TEST FACILITIES

But we were told of test facilities in the Soviet Union that are of the magnitude geographically of the whole State of Rhode Island, that amount of real estate set aside for testing; that their troops and all of their troops frequently test operations, both equipment and living conditions, under almost real gas conditions. This represents commitment to a very thorough training program.

And I think another symbol that I take very seriously is the fact that they have academies comparable in some respects to West Point and Annapolis, with 4-year curriculums, where their officers go and devote their total military career to the study of warfare involving chemical weapons. There are better than half a dozen such institutions in the Soviet Union, training thousands upon thousands of officers, in sharp contrast to each of our military services.

INTENSIVE ARMY PROGRAM

You testified this morning that the Army probably has the most intensive program, of a year or more, and the Air Force somewhat less, and the Navy program may be only several weeks in duration; and that superimposed on the military structure of the Soviet Union is a whole infrastructure devoted solely to chemical weapons, commanded by a senior officer, and his juniors are integral to each of the military units.

And at times we can expect these units to be operating under the control and direction of the chain of command involving chemical weapons.

And finally, on the question of nuclear weapons, I made the observation in the opening statement that the absence of a credible deterrent by the U.S. forces raises the threshold of our commanders and limits the number of options they have short of deploying tactical nuclear weapons as a retaliatory measure. Would you care to comment on that?

RESPONDING WITH NUCLEAR FORCE

Mr. **Perle**. I think it is clear, Senator Warner, that if we find ourselves in the situation in combat where the Soviets resort to the use of chemical weapons on the battlefield, if we are unable to respond in kind we will be faced with the choice of taking whatever losses are entailed in failing to respond in kind or escalating to a higher level. And the higher level would be the nuclear level.

Senator WARNER. Would you classify chemical weapons in the same category as mass destruction in terms of human life, in that sense, the same as nuclear weapons, the weapons of mass destruction of human life?

Mr. PERLE. I think they share with nuclear weapons the quality of indiscriminateness with respect to going beyond the immediate military objective, I think that is quite right.

Senator WARNER. And therefore the contiguous civilian population to any military action are at the same jeopardy and risk as our troops.

Mr. PERLE. Well, indeed, the contiguous civilian population without protective gear might be in even greater jeopardy than troops on the battlefield. There is no question about the inhumanity of chemical weapons. I think that is clear.

Our purpose is to deter their use and to deter their use in two ways. One is by strengthening, I should almost say beginning from the ground up, to develop a comprehensive defensive capability. And the other is to provide a capability to retaliate with chemical weapons if the Soviet Union should use chemical weapons first against us.

We have come reluctantly to the conclusion that mere defensive measures alone will not do that, and therefore we seek a modest retaliatory capability that is in no sense intended to match the Soviet Union. We do not intend to integrate chemical weapons into our own strategy on anything like the scale that the Soviets have already accomplished, but we seek only the minimal modest capability necessary for deterrence, but safe deterrence with modernized weapons.

Let me just underline the essentially defensive nature of the administration's program by pointing out that 80 percent of the funds that will be expended for this purpose over the next several years are devoted to the defensive program and only 20 percent will go toward the modernization of the retaliatory capability.

Senator WARNER. Thank you, Mr. Secretary.

We will now hear from Dr. Wagner.

STATEMENT OF DR. RICHARD L. WAGNER, ASSISTANT SECRETARY OF DEFENSE, ATOMIC ENERGY

Dr. WAGNER. Senator, if I may, I would like to add a few more points to the description of the Soviet posture with regard to chemical weapons, some of which you touched on.

SOVIET POSTURE ON CHEMICAL WEAPONS

The Soviet Union has a military doctrine that sees the use of chemical warfare as being of value and particularly when used in massive quantities and with surprise. The Soviets possess a wide variety of chemical warfare agents, including nerve, blister, and blood agents. The Soviets possess a variety of means to deliver chemical agents in warfare, including aerial bombs, spray tanks, tactical missiles, artillery and mortar projectiles, rockets, mines.

The Soviet Union has the potential in existing facilities to produce very large quantities of chemical warfare agents. They have, as you mentioned, large and well trained chemical warfare forces in all the services, comprising over 60,000 active personnel. That branch is one of four specialized branches which reports directly to the ministry of defense.

The Soviet Union, as you said, has a large and expanding chemical proving ground. They provide extensive chemical protection for their forces. They have widely distributed individual protective suits and field shelters. They have fighting vehicles, such as tanks and armored personnel carriers, which are provided with positive pressure systems to keep the contaminants out of vehicles.

They have invested very heavily in capabilities to decontaminate their personnel, equipment, and the actual terrain. They have about 12,000 modern decontamination and reconnaissance vehicles.

Those are all things that we know about the Soviet Union's extensive chemical warfare capabilities. There are some things we do not know, at least with great accuracy. We do not know the size of their chemical munitions stockpile. We do not know exactly where the chemical munitions are deployed, and we do not know the size and scope of their research and development effort, although we do know it is an active program and it probably includes the development of new agents.

SOVIET CHEMICAL MUNITIONS STOCKPILE

Despite the fact that we do not know the exact size of their chemical munitions stockpile, even our low estimate of that stockpile provides a very significant military capability, not only to produce casualties, but also to force us to operate in protective equipment, which reduces our operational capabilities substantially, a point mentioned earlier.

In the face of this threat and in light of the fact that over the last 10 or 12 years the U.S. capability has declined substantially, the administration feels that we must undertake this modernization program which the gentlemen from the services and my colleague Dr. Gold will describe in a little more detail. That program consists of three parts.

U.S. CHEMICAL MODERNIZATION PROGRAM

The first part is the defensive protective capability, the second is the retaliatory capability, and the third is a program to safely dispose of the obsolete and deteriorating munitions that were built during the fifties and sixties.

The bulk of that program during the next 5 years will be devoted to the development and deployment of defensive protective capability. During the first few years, this year and next year, much of the emphasis will be on research and development, rather than actual procurement of the equipment, in order to put us back in a position, after the neglect of the last decade or so, of knowing the technology that is required to be most effective.

In the retaliatory area, we feel that we must undertake a modernization program, that protective measures alone will not suffice because of the operational degradation which even the best protective measures will impose, and also because the Soviets place great emphasis on surprise in their use of chemical warfare, and we may see substantial casualties before we can get into a protective posture.

We feel that the retaliatory component of our modernization program should, as Secretary Perle mentioned, be the smallest and safest production and deployment that we can see which will force the Soviets to also operate encumbered by their defensive equipment. That is the penalty we want to impose on them, so that they will not see an advantage to using chemical warfare themselves.

In order to achieve such a modern retaliatory capability, we feel we must begin to develop and deploy what are called binary munitions, which are safer, can be made more secure, have considerably easier logistical arrangements, and which in general represent the quality technology of the future for this small, safe, secure retaliatory force.

[The prepared statement of Dr. Wagner follows:]

PREPARED STATEMENT BY DR. RICHARD L. WAGNER, THE ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY)

Mr. Chairman and Members of the Committee, I appreciate the opportunity to appear before you in support of the Administration's program to deter chemical warfare. As you may know, several months ago my office was designated as the focal point for all chemical matters within the Department of Defense. Since that time, we have been adding staff to do this job. To assist me in carrying out these new responsibilities, I now have a newly appointed Deputy for Chemical Matters, Dr. Ted Gold, who is supported by a small professional staff. I also chair the DOD Steering Committee on Chemical Matters, consisting of representatives from throughout the Office of the Secretary of Defense, the Services, the JCS, and the Defense Intelligence Agency. Additionally, in formulating our program, we have been working closely with the Department of State, the Arms Control and Disarmament Agency, and the National Security Council. We have recently submitted to Congress a full report on our program to deter chemical warfare.

With me today are three representatives from the Services—Maj. Gen. Niles J. Fulwyler, Director, Nuclear and Chemical Directorate, U.S. Army; Rear Adm. Byran W. Compton Jr., Director Strike and Amphibious Warfare Division, U.S. Navy, and Lt. Gen. Kelly Burke, Deputy Chief of Staff, Research, Development, and Acquisition, U.S. Air Force. I will be providing the rationale behind the program to deter chemical warfare and an overview of that program; then, each of these gentlemen will provide additional information pertaining to their areas of responsibility.

You have heard this morning of the Soviet Union's formidable capability to wage chemical warfare and fight in a contaminated environment. Soviet military doctrine envisages the use of chemical weapons and acknowledges their value, particularly when used in massive quantities and in surprise attacks. The USSR possesses a variety of lethal and incapacitating chemical agents and the means to deliver them including missiles, rockets, artillery, and aircraft. They have a large and well-trained chemical organization. They have a large and expanding chemical providing ground, and they train with actual, though diluted, chemical agents. They have invested heavily in protective and decontamination systems and have distributed these widely to their forces. In addition to these extensive programs for standard types of chemical agents, a major biological accident at a military-controlled facility in Sverdlovsk and evidence of toxin use in Southeast Asia indicates that the USSR's arsenal also includes toxic substances specifically prohibited by the Biological and Toxin Weapons Convention.

In contrast during most of the 1970s, the United States allowed its chemical retaliatory capability to decline; did little to improve chemical protection; and neglected relevant training and doctrine. The United States has not produced lethal or incapacitating chemical agents, or filled munitions since 1969. Further, in 1969, the United States unilaterally renounced the use of biological and toxin weapons; and subsquently, all biological and toxin stocks were destroyed.

The Soviet Union today possesses a decisive military advantage because of the large asymetry in chemical capabilities. The advantages they enjoy in the conventional arena are amplified when the respective chemical capabilities are considered, and thus, there would be an incentive for them to use chemical weapons in potential future conflicts.

Pending achievement of a complete and verifiable ban on chemical weapons, we must deter the use of these weapons against United States or our allies. The administration's CW program is a prudent and restrained response to the severe chemical warfare threat. The program will deter chemical weapon use by eliminating the significant advantage the Soviet Union would now gain from initiating the use of these weapons. Before we describe this program, I want to address three basic questions often raised regarding possible responses to the Soviet CW threat. The answers to these questions provide the basic rationale for our program.

The first question relates to the role of our nuclear forces in deterring chemical warfare against us. I believe that we cannot rely on our nuclear posture as a credible deterrent to chemical use since the Soviets have gained at least parity in the nuclear arena. Furthermore, barriers to nuclear weapons use should be kept as high as possible; not lowered to counter threats which can be handled in other ways. Therefore, to deter the use of chemical weapons against the United States or our allies, we must eliminate the significant advantage the Soviets would now gain by initiating such use.

The second question is: Why not rely completely upon improved protection against chemical weapons—after all, in many situations, protection against chemical weapons is feasible?

Improved protection can save lives and reduce casualties; and we view a strong protective capability as a critical component of our program to deter chemical weapons use. Indeed, this is the area requiring the most emphasis in resource expenditure. However, as important as protective measures are, alone they are insufficient to deter chemical use against us. With current chemical protective gear, we face a 30-50 percent decrement in operational effectiveness due to the restrictions imposed by protective equipment and procedures. We are expending considerable time, effort and money to develop better protective equipment; however, improved equipment will not eliminate the performance decrement. If we are forced to operate encumbered by protective systems while the enemy is allowed to operate unencumbered in a clean environment, chemical weapons can offer him the same results as a high casualty rate, even if he kills no one. This is a decisive advantage and is an invitation to use chemical weapons against us. Therefore, in addition to improving our protection against chemical weapons, we also need the capability to force the initiator of chemical warfare to use his protective systems and also suffer a performance decrement; only then will he see little advantage in using chemical weapons and thus be deterred.

Finally, after acknowledging that both improved defensive and an effective retaliatory capability are needed to deter—the third question is why not rely upon our current chemical munitions stockpile?

To be an effective deterrent, a chemical stockpile must be able to threaten critical elements of an enemy's force structure. These include front line, second and third echelon troops; critical command, control, and communications centers; airfields; logistics facilities; and transportation nodes. It must also provide commanders the flexibility, in terms of agent and weapon systems, to match retaliatory chemical strikes to the target characteristics and military objective. Finally, there must be sufficient munitions to sustain retaliatory operations long enough that an enemy will see no advantage in prolonging a chemical exchange.

The current U.S. retaliatory stockpile is inadequate for this deterrent role. More than two-thirds of this stockpile is not immediately usable today, because it is stored in bulk containers. Munitions would have to be built and loaded to use this material. Much of the remainder is in ammunition for weapons which have been or will be phased out of service. Also, more than half the usable agent is less versatile mustard, which freezes at about 58° F. Probably of most significance, the stockpile is lacking in weapons suitable for use against rear echelon tactical targets. The only way to force long-term degradation on rear targets is to contaiminate them with a persistent agent. However, all our bombs are filled with nonpersistent nerve agent. The rear echelon persistent agent capability is in a small number of aircraft spray tanks. Also, the newest munitions are 13 years old, and the stockpile cannot remain usable indefinitely.

Also, by their nature, the current unitary munitions impose logistical and operational restrictions which reduce their utility and increase costs. They require elaborate safety precautions during storage, handling, and shipment. For example, the Air Force spray tank weighs about 2,000 lbs. but comes, in a 4,000-lb. shipping container. Thus, two-thirds of the transportation requirement yields no combat capability. Unitary munitions also present a hazard to our own positions if damaged by an enemy attack. Finally, unitary munitions are extremely difficult and costly to dispose of.

The choices before us are not deterrence or defense or retaliation. Grouping these as alternatives confuses objectives and means. Our objective is deterrence—the means of achieving this objective are to improve both our defensive capability and our ability to force an initiator of CW to also operate in a contaminated environment. Both are necessary to deny this significant advantage the Soviets would now have for initiating chemical warfare.

In view of the above, the administration has decided to improve our protective capability and improve the retaliatory capability with a mix of binary munitions. (Binary munitions are being developed by the U.S. contain two separate relatively non-lethal substances which are mixed when the munition is in flight to the target to yield the standard nerve agents.) The plan will provide force sustainability and improve operational effectiveness in a contaminated environment, while correcting chemical weapons stockpile deficiencies. Binary munitions are preferable to filling more unitary munitions, because they can be more easily moved forward in times of crisis; do not present a hazard if damaged in an attack on our munitions areas; and provide significant safety and logistical advantages throughout the manufacture, storage, use, and eventual disposal sequence.

So, we must modernize our retaliatory capability. It is our intent to do so with the smallest, safest retaliatory stockpile which is sufficient to force the enemy to endure the degradation of his capabilities that comes from using protective equipment.

Our NATO Allies have been informed of our intent to improve U.S. retaliatory capabilities. They recognize the chemical threat and are committed by the NATO Long Term Defense Plan to improve their chemical defenses. This U.S. decision involves development and production only. Our Allies have also been informed that no decisions or recommendations have been made regarding deployment of chemical weapons. Should it ever be determined that overseas deployment is desirable, there will be full consultation with the nations involved prior to making any decision.

I now wish to address the chemical weapons deterrence program itself. The objective of the protective component of our program is to ensure our military forces can survive and to give them the best possible ability to sustain effective operations in a contaminated environment. There are three basic elements to our protective program: To reestablish a strong technology base, to develop appropriate doctrine and conduct training relevant to operating the chemical environment, and to procure and deploy protective equipment in sufficient quantity and quality to provide for sustained operation. A strong technology base and research and development program are required as insurance against technological surprise and to produce new protective systems which reduce the restrictions associated with present equipment and fill the many gaps in our current protective capability. It is necessary to update, and in some cases, create military doctrine to integrate chemical defense into our combat capabilities. We must also train our forces to perform the wartime tasks while using protective systems. This training should be under the most realistic conditions possible—preferably field exercises using training simulants. Finally, we need to field sufficient quantities of the best possible protective systems in the following categories: individual protection, collective protection, detection and warning, decontamination, and medical.

Major progress in the past few years, in addition to raising awareness of the chemical threat, has been in the distribution of individual protective equipment, particularly to our soldiers and airmen, and in expanding training and initiating development of doctrine.

There are both qualitative and quantitative deficiencies in our present chemical protective capability.

Key deficiencies for all Services are the lack of protective clothing which is not debilitating in its own right; collective protection systems for key equipment, facilities, and rest and relief areas; adequate detection and warning devices capable of responding to all threat agents; decontamination equipment and agents which are effective and usable on all equipment; and the capability to treat large numbers of chemical and conventional casualties in a toxic environment. Finally, much remains to be done to implement relevant training and develop appropriate doctrine.

The protective component of our program aims directly at correcting these deficiencies. The total fiscal year 1983 request for protective purposes is $508M. Of that amount, RDT&E to solve our longer-term qualitative problems represents $236M. Acquisition of defensive systems, through our procurement and O&M accounts, comes to $262M, and $9M is for construction of training facilities. Investment in protective improvements represents more than 70 percent of our total fiscal year

1983 chemical budget request and is expected to remain more than two-thirds of our program costs through fiscal year 1987. RDT&E costs, the bulk of which are borne by the Army as executive agent, will remain high as we search for better protective systems; however, the proportion devoted to acquisition will increase as the RDT&E program bears fruit. We also will be placing major emphasis on chemical doctrine, training, and exercises. We believe our greatest short-term payoff will come from more and better training.

The objective of the retaliatory component of our program is to maintain the smallest, safest stockpile that denies a significant military advantage to any initiator of CW. We need not, and will not, plan to match the Soviets in agent/munition quantities and types. Rather, our stockpile requirements are driven by the need to force the initiator of chemical warfare to operate encumbered by protective clothing and burdened by the logistics and redirection of combat power necessary to sustain operations in a CW environment. Factors considered in deriving stockpile requirements include the potential targets for chemical retaliation, weapon and agent effects, exploitable Soviet vulnerabilities, U.S. doctrine and force structure, and estimates of the duration of potential conflicts. Because growth in the Soviet chemical stockpile would have little bearing on the number of suitable chemical targets in their force structure, our munitions requirements are largely insensitive to changes in their stockpile size.

Our program to modernize the U.S. retaliatory stockpile is two pronged: enhancing the readiness of the current stockpile and producing binary chemical weapons.

The readiness of current weapons will be enhanced by obtaining minimum cost maintenance facilities and increasing maintenance. However, this will not alter the decline in usable munitions due to the phasing out of delivery systems. This maintenance effort will cost approximately $19M in fiscal year 1983, including $1M for construction of a maintenance facility on Johnston Island. This maintenance effort is required to maintain a retaliatory capability until binary munitions become available.

Our plans are to produce two binary weapons, the 155mm artillery projectile and the Bigeye bomb, during the fiscal year 1983-87 period to provide the capability to attack both front line and rear echelon targets. When fired, the 155mm artillery round yields the nonpersistent nerve agent GB. The Bigeye will yield the persistent nerve agent VX. In manufacture, storage, and shipment, the two binary components will be separated. The components will not be mated until authority is received to conduct retaliatory chemical attacks, and the actual agent is not produced until the munition is in flight to the target. The total binary funding request for fiscal year 1983 is $104M, $30M of which is for munitions procurement. The remainder is for RDT&E ($32M) and constructing and equiping Bigeye production facilities ($42M). Procurement of these munitions is expected to cost less than $1B during the fiscal year 1983-87 period.

Beyond 1987, requirements for production of the 155, Bigeye, or any other chemical weapon will depend on the outcome of disarmament efforts and continuing refinement of military needs. A major role of my office will be to closely evaluate these needs.

Approximately 10 percent of our fiscal year 1983 budget request ($74M) is for demilitarization of unserviceable munitions ($61M) and R. & D. aimed at finding more cost effective demilitarization technology ($13M). Ultimately, the entire unitary stockpile must be disposed or whether we achieve a chemical weapons ban or replace the stockpile with binary munitions. Using current technology. This will cost from $2-3B with most of the cost occurring in the 1990s.

We anticipate expenditures for chemical warfare deterrent programs will be approximately $6-7B during the fiscal year 1983-1987 period. Chemical protection will account for approximately two-thirds of the projected costs, with the remainder allocated to provide a retaliatory capability and continue RDT&E and pilot plant demilitarization for obsolete existing chemical stocks.

In summary, the ultimate U.S. chemical warfare goal is to eliminate the threat of chemical warfare by achieving a complete, verifiable ban on chemical weapons. Our program supports this goal by improving our military posture sufficiently so that the Soviets will perceive they have little to gain from such warfare and thereby give them incentive to join with us in our objective of seeking a complete and verifiable ban on the development, production, and stockpiling of such weapons. If we are successful in achieving this ban, we will be able, and in fact eager, to terminate the chemical weapons program at any time.

As a final thought, I would like to point out that since the end of World War I, all use of toxic chemical weapons has been against those who could not protect themselves and who had no ability to retaliate. Even in the intense European conflict of

World War II following D-Day, Hitler did not use his chemical arsenal. He believed the Allies stood ready to retaliate. Preparedness, real or perceived, has been the only successful deterrent to chemical use in the past, and we believe it would be the successful deterrent in the future.

This concludes my statement. I would be pleased to answer questions at this time, or perhaps you would like to hear from my Service collegues now and we can all respond to questions later.

Dr. WAGNER. That is a summary of our program. I would like now to turn the floor over, if I may, to Dr. Gold, who will describe it in somewhat more detail, and then on to the representatives of the services.

Senator WARNER. Thank you.

Dr. Gold?

STATEMENT OF DR. THEODORE GOLD, DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE FOR CHEMICAL MATTERS

Dr. GOLD. Thank you.

Before I describe, in general terms, our program to deter chemical warfare followed by the representatives of the services who will provide a more focused account of their respective activities, I do want just to spend a few moments in reiterating the major themes you have heard so far, which really provide the rationale for the program.

SOVIET CHEMICAL WARFARE THREAT

One, there is a threat. Despite the fact that we do not know as much of all aspects of it as we would like, the Soviets have a formidable capability to wage chemical wareface that prudence dictates we must take seriously.

The second point is that defensive protection measures alone will not redress the advantage they have from using chemical weapons. As you will see, improved protection is a vital part of our program, but alone it is insufficient to redress that imbalance. The improved protection can theoretically save lives, but it also causes a degradation in operational performance.

To deter, we also need to be able to force upon the Soviets or any initiator of chemical warfare that same contaminated environment, and to force him into a protected and therefore degraded posture. So therefore we need a credible and effective retaliatory capability.

The third key point, then, is that our current stockpile does not provide that effective retaliatory capability. It is deficient particularly in qualitative terms, and we need to address that problem.

Basically, our program is comprised of the three elements that Dr. Wagner has mentioned: a protective portion, a retaliatory portion, and the very important demilitarization program. The objective of the protective portion is to insure that our troops can not only survive a chemical attack, but could sustain operations on the battlefield with minimal degradation of performance.

Over 70 percent of the fiscal 1983 budget request would be to support protection measures, and that percentage will hold pretty constant throughout the 5-year plan. Approximately two-thirds of the total funding which we expect to see in this program goes to support improved defenses against chemicals.

IMPROVING PROTECTION PROGRAM

The program to improve protection basically has three elements: One, we are procuring and distributing current generation equipment to our troops in the field; No. 2, we are trying to reestablish a vigorous technology base which has not been in existence for well over a decade, not only to develop and generate improved methods of protection, but also guard against technological surprise; and last but not least, we must develop proper doctrine for operating in a contaminated environment and institute relevant training.

There is a problem of reversing and redressing a decade long lack of activity in this area, and it is not something that you can just do overnight. As you know, this not the first year of attempting to improve our protective posture. Some progress has been made in the last 4 years, not only in increasing awareness of the problem, but the procurement and distribution, particularly of individual protection equipment.

As the service people will explain later, there still are serious deficiences not only with the quality of individual protection equipment but also with the quantity and quality of collective protection, detection and warning, and decontamination equipment and the whole question of medical treatment. Progress has also been made in the last few years on taking doctrine development and training more seriously, and a key highlight here has been the reestablishment of the Army's chemical school at Fort McClellan, Ala.

So as I mentioned, the protective element is a necessary and vital part of the program, one that will absorb most of the funding this year and in the foreseeable future. But alone, it is not sufficient to deny an advantage to the initiator of chemical warfare.

COPING IN A CONTAMINATED AREA

I have been on the job for all of 2 weeks, so I am reluctant to talk from my own personal experience. A little later this afternoon you will hear from experts in this area. However, I have spent part of the last 2 weeks at the Army chemical school getting a feel for just what it takes to operate in a chemical environment, encumbered by a mask, by gloves, by a protective suit, by boots, and attempting to do tasks, such as firing a gun with full protective gear on, or go through a decontamination station, which is a very cumbersome and awkward process even without the threat of the penalty of making a mistake. And I was told I made about six or seven mistakes in peeling off gloves and other clothing.

The great burden on a force that has to operate in a contaminated environment leaves the other side at a tremendous advantage if he does not also have to operate with those same encumbrances.

Thus, we need a retaliatory component of our program. That component has two elements to it. One, we are improving the readiness of our current stockpile to get maximum utility of that until our binaries can be ready; and the second element is to develop and procure binary munitions.

Current plans are to produce two weapons: A Bigeye bomb, which fills a vital gap in our capabilities. We need the ability to hit any aggressor, any initiator of chemical warfare, in the rear, in depth, and the Bigeye bomb, which has a persistent chemical agent, one that would contaminate areas and keep them contaminated for a long time—that would go a long way to providing a great deal of encumbrance for his offensive operations.

The second weapon that we plan to procure is a modern 155 millimeter shell with a nonpersistent agent, and that would give us a modern all-weather artillery shell that does not have the logistics and safety burdens of our current shell.

Our objective in the retaliatory portion is to have the safest, smallest stockpile that would give us a credible deterrent. We believe that the eventual binary stockpile will be smaller in agent tons than the one we have today. However it would be more militarily effective and safer than what we have today.

Again our objective in the retaliatory portion is limited: to deter chemical warfare by letting any aggressor know that he would also have to operate in a contaminated environment. There is no need to and we have no plan to match the Soviets in numbers of agent tons or type of agents. The objective is on the much more narrow military ground of forcing him into a protected and therefore encumbered posture.

U.S. CHEMICAL WARFARE GOAL

In summary, the ultimate U.S. chemical warfare goal is to eliminate the threat of chemical warfare by achieving a complete and verifiable ban on chemical weapons. Our program, which is I believe is a prudent and restrained response to a serious threat, supports that goal by improving our military posture sufficiently so that the Soviets will perceive they have little to gain from such warfare and thereby give them incentive to join with us in our objective of seeking a ban.

Thank you.

Senator **Warner**. Thank you very much.

Let us start with a military representative, General Burke.

STATEMENT OF LT. GEN. KELLY H. BURKE, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION, HEADQUARTERS, U.S. AIR FORCE

General **Burke**. Mr. Chairman, we often in these discussions tend to focus on how people fight wars and conduct themselves in national hostilities, and I think we do that when it is analytically convenient. It is easier to put numbers to that type of thing. But in truth what we are trying to do with our proposals, is first, help deter the war, and second, in the unhappy event we do not succeed in that, deter escalation from the conventional level into the chemical and biological area.

And in that context, I think of all the imbalances about which we could talk that exist between ourselves and the Soviet Union the one that is the most troubling to me is this gross asymmetry that exists between the chemical warfare capabilities of the two sides. And it goes beyond mere numbers in the stockpile. It goes to the thing that you spoke of earlier, including an infrastructure and a training program of a year's standing and the status that is attached to this type of activity and many years' history of designing equipments that can survive in this battlefield, rigorous training programs, the doctrine, and perhaps most important of all the evident willingness to use such weaponry both directly in Afghanistan and through surrogates in Southeast Asia.

DETER BY DEFENSE OR THREAT OF RETALIATION

There are two ways that we can deter. In simple terms we can deter by defense or we can deter by threat of retaliation. In the defensive area the Air Force, along with other services, is doing a great deal. We are buying the available equipments now for defensive purposes. We are conducting a fast-paced research and development program to improve those, and we plan to spend very large sums of money during the rest of this decade for that purpose. In fact, we might spend up to something like $2 billion for the purpose of detection equipment, protection equipment, and decontamination equipment, and it is right and proper that we do that.

However, it is also insufficient. Even if we were to spend $20 billion, we would not have structured a defense that was sufficiently impregnable as to present an unattractive target to the Soviet Union. It will not come close, and I know of no one who holds out a prospect that you can build a defense that the Soviets would make a calculation that it would cost them more to attack than they would gain from that attack. I just do not know how that is done, at least in our business of airfields and airplanes.

So that means necessarily and absolutely we must have the second element, and that is an offensive capability, a sufficient capability to provide the retaliatory force that would deter the Soviets from taking that step to begin with. In that regard, the Air Force, along with the Army and Navy, is participating in the development efforts for this Bigeye binary weapon, and when available we plan to procure it.

And that, sir, is a quick summary of the Air Force.

[The prepared statement of General Burke follows:]

Statement of Gen. Kelly H. Burke, Deputy Chief of Staff, Research, Development, and Acquisition, Headquarters, USAF

Mr. Chairman and Members of the Subcommittee, I am very pleased to be here today to present the Air Force program for Chemical Warfare. The Air Force program has been carefully constructed and is fully integrated into the overall DOD Chemical Warfare Modernization Plan.

The Air Force program consists of balanced offensive and defensive modernization efforts. Today our tools for both offense and defense require modernization to keep pace with changes in the threat and changes in our major weapon systems. Technological advances, like the binary chemical munition, permit safer storage and handling of chemical weapons. Chemical defense modernization increases our ability to survive an enemy's attack, but defensive measures alone do not deter an enemy. Real deterrence, the elimination of perceived chemical warfare military advantage, is achieved only when potential enemies are certain that we can and will subject their forces to the same intolerable offensive chemical capability they threaten us with now to avoid an enemy regarding it only an empty threat.

Our offensive modernization effort is the Bigeye spray bomb. The Bigeye is a binary chemical munition which is the air deliverable counterpart of the binary artillery projectile developed by the Army. Binary munitions will provide a quantum jump in handling safety and accident prevention compared to the aging, pre-1969 munitions they will replace. The unique and most attractive characteristic of binary munitions is that their contents are not deadly until mixed after they are fired from a gun or armed and released from an aircraft. The bombs and artillery rounds are complimentary systems that together provide United States Forces range and flexibility similar to that afforded by Soviet chemical delivery systems, with the greatest possible margin of safety.

The Navy is the executive Service in development of the Bigeye binary bomb, and we are joined with them in that effort. Bigeye development has continued through fiscal year 1981 and 1982, and the Air Force will certify the weapon for compatability, carriage, and release on our aircraft in fiscal year 1983. Procurement of the weapon and chemicals for stockpile modernization should begin in fiscal year 1984.

The objective of our chemical and biological defense equipment program is to develop equipment to ensure survival of our forces during a chemical attack and to enable them to continue to operate in a toxic environment. The program's defensive chemical warfare project areas are Biochemical, Chemical and Biological Agent Detection, Individual Protection, Collective Protection, and Decontamination. The Biomedical effort addresses sustaining operations and limiting and handling casualties in a toxic environment. Detection and alarm systems will warn of the presence of liquid and vapor chemical agents. Individual protective equipment will provide improved protection and a reduced physiological and thermal burden for the wearer in comparison to present equipment. Collective protection systems will provide filtered air for toxic free work and rest areas. Decontamination will reduce post-attack hazards by removing or neutralizing persistent chemical agents.

In this program to date we have fielded near-term aircrew and ground crew protective ensembles consisting of chemical resistant clothing, headgear, gloves, footgear, and eye/respiratory apparatus. We have established design criteria for collective protection shelters, acquired shelter modification kits, and fielded automatic point-sampling chemical agent detectors. We have completed a systematic evaluation of available decontamination compounds and equipment and analysis of overall Air Force chemcial defense requirements. Competitive development of aircrew eye/respiratory systems and surface contamination monitors is continuing as are broad collective protection and decontamination evaluations.

In the planned program for fiscal 1983, first item hardware deliveries of advanced decontamination equipment and collective protection systems will be evaluated, as will joint service developments such as the simplified collective protection system and improved head and footwear. A production decision is scheduled for the surface contamination monitor. We will support tests to determine actual levels of performance degradation experienced by personnel wearing protective clothing. The increased funding this year will provide more rapid progress toward reducing mission degradation in a toxic environment and improving our ability to conduct sustained operations.

Your support for these ongoing efforts will give the United States a credible deterrent against chemical warfare and provide the protection necessary should this deterrence fail. This concludes my statement. I will be happy to respond to any questions you have at this time.

Senator WARNER. One point you mentioned, this morning, is that once you have to go into the protective equipment that is now used in the Air Force, the degree to which your airfield operations are degraded.

General BURKE. I think a picture is worth a thousand words. A live demonstration is perhaps worth a thousand pictures. And I have just outside the room Lt. Ed Cantwell, who——

Senator WARNER. But that will not appear in the record, as dramatic as it may be. Let us have it in the record what you think that degradation is.

General BURKE. All right, sir. I think that degradation is, today's level, on the order of 80 percent while under a threat of attack, and if we do everything we know how in the defensive area perhaps we might get that to 50 percent.

Senator WARNER. Why do you not describe—some of this is being recorded for radio—so that the listeners can understand. An Air Force pilot has come into the room garbed in the chemical protection suit that is now integral to the Air Force, and you may describe that if you would, please.

CLOTHING EQUIPMENT CUMBERSOME AND AWKWARD

General BURKE. Lieutenant Cantwell flies F-15's at Langley, and I think he will tell you he enjoys that very much. He gets to do it from time to time in this garb, and I think he would tell you he does not enjoy that at all. It is cumbersome, it is awkward. It is made up of equipment that is available. We have borrowed it from the British; we have borrowed it from the Army.

He starts out with special underwear which is impregnated with charcoal, which is intended to serve as a filter. The danger of that is if he perspires too much and gets wet, then that is lost.

He has the modified helmet that we have borrowed from the Army helicopter program. The mask is the full-face firefighters mask that you might recognize. Additionally he makes use of his normal NOMEX flying suit, some plastic, and there is a neck scarf to protect that region. And he is as buttoned up as he can be.

And I think just looking you can get some idea of how cumbersome and how awkward that is. And having said that, I will point out that Lieutenant Cantwell has a job that is best equipped to handle this sort of thing. His place of business is the cockpit of an F-15, in which it is expected that a man will be confined with a great deal of protective equipment. Hence everything is immediately accessible and there is not much requirement for him to move distances, carry loads, or even to exercise a great deal of manual dexterity, as the people who would maintain that airplane, arm that airplane, and fuel that airplane must do.

Senator WARNER. Any comments from the wearer of this garb?

Lieutenant GANTWELL. It is good to be out of it.

From a pilot's point of view, the equipment certainly has limiting factors. That is not to say we would not take it and go with it. And the limiting factors are mainly, for a fighter pilot who flies a single-seat fighter, is the helmet and the mask, because if you are going to fight an engagement with a bandit or an enemy aircraft then the helmet and the mask are the most important things. Mask and helmet, you know, in a fight could weigh up to 200 pounds on your head. So some improvement is definitely needed in that area.

Senator WARNER. What would happen if you had to eject?

Lieutenant CANTWELL. If I had to eject, the helmet and the mask would depart from my face. Whether my face would go with it or not is a matter of contention. But it is very dangerous. In fact, we are not even able to wear the hood in the F-15 and the F-16 and the A-10, because of the ejection hazard. It interferes with our ejection seat.

CHEMICAL THREAT MOST SERIOUS

Senator WARNER. General Burke, of the threats against the U.S. Air Force in its operations particularly in Europe, conventional warfare and nuclear warfare and chemical warfare, which is the threat you regard as the most serious?

General BURKE. Well, certainly they are all very serious. The one that I think is the most serious in the sense that we simply cannot match that step is the chemical. I think that in terms of the Air Force, we will acquit ourselves very well in engagements that is limited to conventional. I think even though there are serious and troublesome disparities in the theater nuclear balance, the Soviets certainly have to consider other nuclear weapons that exist in this country in that calculation, so there is bound to be some inhibition there.

But with this gross asymmetry in chemical warfare I mentioned earlier, in time of crisis, in time of conflict, that certainly could represent an attractive step to them.

Senator WARNER. That would pose your most serious threat?

General BURKE. Yes, sir.

Senator WARNER. I have no further questions. Would my colleagues care to question in connection with this presentation before we move to the next military spokesman?

Senator PRYOR. Mr. Chairman, thank you. I am an interloper here.

Senator WARNER. You are welcome and we are glad to have you.

Senator PRYOR. Let me just ask one question. If the F-15 were on the ground and the Soviets basically sprayed or bombed with chemical warfare at this particular airport, would the F-15 be contaminated to the extent that you could not utilize it?

Lieutenant CANTWELL. No, sir, it would not. You notice, I walk to the aircraft or I would walk to the aircraft with an overcape. So I would be transported in a covered vehicle all the way up to the steps, and I could actually get into the cockpit, take the overcape off and fly in a contaminated cockpit, because I am breathing uncontaminated air through the aircraft and I have protection under my flight suit for what would soak through.

Senator PRYOR. Thank you very much.

Senator WARNER. General Burke, one final observation. You said this morning that that type of equipment would enable the U.S. Air Force today to operate [deleted] in a chemical environment, at the expiration of which time it is unlikely that the operation could continue any further.

General BURKE. It would—I would say that our ability to operate in a sustained chemical environment is measured in hours. Our goal is to increase that to many days.

Senator WARNER. Thank you very much.

We will now proceed to General Fulwyler of the Department of the Army. The Department of the Army has the overall joint service responsibility for the manufacturing and stockpiling of this weaponry.

STATEMENT OF MAJ. GEN. NILES J. FULWYLER, DIRECTOR, NUCLEAR AND CHEMICAL, OFFICE OF DEPUTY CHIEF OF STAFF FOR OPERATIONS AND PLANS

General FULWYLER. Thank you, Mr. Chairman, and I appreciate the opportunity to come and explain the Army part of the program and the rationale that describes the whole program in DOD.

The reality today is that the U.S. Army, and indeed we must all, be unquestionably prepared to fight in that toxic chemical environment.

Senator **Warner**. I understand, you have other personnel waiting. Why do you not have them come in and exhibit the suits and get their suits off?

ARMY SOLDIER'S DEGRADATION

General **Fulwyler**. All right, sir. As the Air Force showed what their degradation is, I will talk a little bit about it in my presentation, but show you what the Army soldier's degradation is. I have Specialist Bowen from the chemical school.

Now the point to remember here is the soldier you see outfitted here is carrying over 100 pounds of equipment. When we talk about degradation, this is what we are talking about, not only to add to his normal load, but when we put him in full protective posture, as you see him here, that is why I maintain that our degradation is 50 percent or greater, and depending where that locale or battle is, it may even be higher.

I also have Sergeant Bagley here from the chemical school who will explain the protective garments as Specialist Bowen takes them off.

PROTECTIVE GARMENTS

Sergeant **Bagley**. Mr. Chairman, my name is Sergeant Bagley. I am one of the senior instructors for the CB department at the Chemical School at Fort McClellan, Ala.

Senator **Warner**. We welcome you, Sergeant.

Sergeant **Bagley**. Thank you, sir.

At the present time, you see Specialist Bowen is wearing what we call the chemical protective overgarment, sir. It has an outer layer of nylon, an inner layer of charcoal-impregnated polyurthelene. Directly underneath that, he is in his fatigues, his combat dress, sir.

On his footwear, sir, he has what we call the overbooties, sir. This will allow him protection up to 6 hours in a contaminated environment itself, sir. Those booties are extremely cumbersome, sir. If he had to run or march for a prolonged period of time he could trip and fall and they are easily ripped, sir, by brush in the area.

On his hands, sir, he has what we call the overgloves themselves, sir. Underneath the gloves, there is a little white liner which makes it extremely easy for him to slide them on. But if he has these gloves on for a prolonged period of time, sweat accumulates in the gloves themselves and makes his dexterity extremely difficult, sir.

The worst part of it is the M17A1 series protective mask, sir, because most of your body heat will be given off through your head itself, sir. Once he has that protective mask on, the overboots and gloves, sir, accompanied with the protective overgarment, he is in what we call MOP level 4, sir. And once he is in MOP level 4, he is under, if he has to work for an extremely long period of time, he is under stress, physical fatigue, and everything else.

The optimum wearing time for the chemical protective overgarment in a combat situation is 6 hours. At that particular time, sir, he would have to go into what we call a collective protective shelter where he would change into another chemical protective overgarment itself, sir.

If I were to ask Specialist Bowen to remove the M17 series protective mask at this time, sir, you would see that his face is completely covered with sweat, sir. If he were to take off the overgarment, you could see his fatigues themselves have completely absorbed sweat.

Senator WARNER. But before he removes anything, would you talk about the operational degradation in the field? How do I know that that is a sergeant or a private, and whom do I follow when I see all these various figures in a platoon formation in an attack?

Senator HART. Mr. Chairman, I think we ought to let him get out of that suit. We do not want him to pass out here in front of us.

Sergeant BAGLEY. Normally, sir, you would not be able to identify the individual himself. However, we can mark the back of the chemical protective overgarment itself with his name or something to that effect so that you could know who he is from the rear, sir.

Senator WARNER. How is his capability of hearing in that?

Sergeant BAGLEY. It is extremely difficult after a period of time, sir.

General FULWYLER. Would you try to say something?

Specialist BOWEN. Yes, sir. Hearing capabilities are hampered slightly through the hood itself, sir.

Senator WARNER. How about the ability to use firearms?

Specialist BOWEN. If I could demonstrate this with a weapon, you have to touch your face to the side along the weapon and it is extremely difficult, sir, to attain accuracy.

Senator WARNER. Any other degradation before we take it off? What about in the tank? How long is the man able to wear that suit in a tank?

Sergeant BAGLEY. Inside the tank itself, sir?

Senator WARNER. Yes.

Sergeant BAGLEY. Again, I could not answer that question, sir. We have never had the individuals wearing——

Senator WARNER. General Fulwyler, do you have any information?

General FULWYLER. Yes. We did some tests on that and the average time, we are starting to lose them somewhere over 30 minutes.

Senator WARNER. When you say you are losing them, the men are just incapacitated?

General FULWYLER. We have to take them out of the tank because they were all monitored and they were at the point of passing out. If there is a doctor here, he would have the term for it, but it is caused from heat stress and loss of moisture in his body.

Senator WARNER. All right. Before we have that occur, as Senator Hart observed, just have this gentleman go ahead and remove the garments.

Senator PRYOR. In other words, if the chemical warfare agent does not kill you, the suit will.

General FULWYLER. Yes, sir, Senator, and that is why we have to be absolutely sure that we can force our adversary in this same posture.

As Senator Hart mentioned this morning, they have as great a problem as we do, if not greater. They use butyl rubber in their outer garment. But that is why just defenses alone is not the answer.

Senator **Warner**. Is our suit superior to the Soviets?

General **Fulwyler**. I think our suit probably is because of the heat stress problem. I would think, and again, I do not know, but the butyl rubber, which is what his gloves are made out of, is what their whole suit is made out of.

There you can see the soldier. How long have you been in that suit, soldier?

Specialist **Bowen**. For about 35 minutes, sir.

Senator **Hart**. Give him a glass of water.

Senator **Warner**. We might also add that he has basically not been doing a great deal except waiting.

General **Burke**. Some of us on this side find that fairly stressful, sir. [Laughter.]

GLOVES CAUSE DEGRADATION PROBLEM

General **Fulwyler**. The gloves indicate another part of the degradation problem. That is, as you know, many of our systems, both the firing and sighting systems, the computerized equipment that we have, the use of these gloves makes it very difficult. You lose a great deal in dexterity because of the bulkiness of the glove itself.

Thank you very much, Specialist Bowen.

Senator **Warner**. Does the soldier have anything to add by way of his experiences?

Specialist **Bowen**. Basically, sir, I have found that through the use of the overgarments and the gloves themselves, it hampers training of the individual through AIT. That is basically where all my experience has been so far. And I have found at different stages, the way I am dressed right now is the only way we can train them for a long period of time. And I mean by long period of time, 1 hour, 2 hours at the maximum.

As far as MOP level 4, we usually do not leave them in that for longer than 45 minutes, up to an hour.

Senator **Warner**. How often have you trained, either one of you Army men, as a routine? The average soldier gets how much training?

Specialist **Bowen**. I have spent—I am in a field training exercise division at the chemical school. I have spent every day of every week out in the field with the individual soldier. We spend roughly 5 to 8 hours of the day actually doing field exercises, and I would say roughly 6 hours of the day they are dressed like I am now; 1 hour of the day they would be in the full ensemble.

General **Fulwyler**. This is training at the chemical school.

Senator **Warner**. The average GI, how often does he get this training?

CHEMICAL TRAINING FOR EVERY UNIT

General **Fulwyler**. It depends on the unit, but there is one area we have made tremendous progress in over the last year so that every unit that I have visited within the last few months, every unit has some type of chemical training.

Now it varies by the unit, but I would say that every soldier in every unit now is getting some kind of chemical training at least once a week.

Senator **Hart**. What about our forces in Europe?

General **Fulwyler**. Yes, sir, that is primarily where the emphasis is. I visited recently three divisions over there and every one of them had a very impressive chemical training program.

Senator **Warner**. Has the sergeant completed his work here today? That is a very good presentation, Sergeant. To both of you we are grateful.

Sergeant **Bagley**. Thank you, sir.

Senator **Warner**. But we cut him off to enable the man to disrobe. I did not know whether the sergeant had further comments.

General **Fulwyler**. Sergeant, do you have anything further you would like to tell the committee?

Sergeant **Bagley**. No, sir. The only thing I want to say in concluding, sir, is that with the protective clothing that we have now, sir, there is definitely room for improvement, sir, because it really hurts the soldier in the long run.

Senator **Warner**. Thank you, Sergeant.

General Fulwyler, if you would continue.

TOXIC CHEMICAL ENVIRONMENT

General **Fulwyler**. As I indicated or started to indicate, we have to be prepared, not just the Army, but all the services, to fight in a toxic chemical environment requiring the use of that kind of equipment that we have just seen in the last few minutes here, because we are just today coming to grips with one of the realities of the day, and that is what we term the integrated battlefield. That is a battlefield that is far different than any we have ever had to fight on before. And it is a battlefield where we can expect the use, in addition to conventional high explosives, we can expect the presence of both nuclear and chemical warfare some place on that battlefield, and where we can expect the combined synergistic effects of nuclear, biological, and chemical weapons. And it might very well be the combination of those factors will decide who wins and who loses and whose national security is preserved and whose is lost.

We believe that we must have both a sustained, defensive capability and a credible retaliatory capability to execute the U.S. policy of deterrence. I have to tell you that today we cannot meet the requirements of that policy. Our forces are not equipped to conduct sustained operations on the battlefield. Our chemical stockpile is inadequate to deter an adversary's first use of chemical weapons. And given the initiation of chemical warfare by the Soviets in Europe today, I believe that we would surely have to risk going nuclear or accept decisive defeat.

IMPROVED DEFENSES NEEDED

Improved defenses, as pointed out this morning, can save lives. It can certainly reduce casualties, and it would reduce but not eliminate significant degradation of our military performance.

As you can see, protective equipment reduces mobility, slows operations, and makes many tasks difficult, if not impossible. As I said this morning, if full protective clothing has to be worn, there will be at least a 50-percent degradation of operational capability.

So, reliance solely on improved defenses would leave the initiators of CW largely free to operate without the constraints imposed by protection, thereby yielding to him a major advantage and indeed perhaps encourage the use of chemical weapons.

So in addition to improving our defenses, I believe it is absolutely imperative that we maintain a credible and an effective capability to retaliate with chemical weapons, to reduce an enemy's or adversary's first use. If he chooses to initiate chemical warfare, he must know that he, too, will have to operate with the encumbrance of protective equipment.

It should be emphasized that if we are not prepared or our national will is not clearly articulated, I believe that we invite the use of these weapons because the Soviets believe that they could win by using them.

The United States has not produced any chemical munitions since 1969, the last of which was the Navy's Weteye bombs. As a consequence of this, the quantity of usable munitions to support our national security requirements today has declined over the years, even though the threat has increased. And as a result, the United States currently has only a marginal capability to conduct chemical retaliatory operations.

OUTDATED MUNITIONS

The utility of the entire current U.S. inventory is questionable because of age and the fact that we have not test-fired any munitions since 1969. We have a very limited quantity of agent tons in both ready-for-issue and repairable status. And much of that is World War I-type mustard, which freezes at 58° and which you must agree with me would have little utility in a European environment. Another statistic we should be aware of is that approximately 43 percent of that stockpile is mustard.

In addition, a large proportion of our stockpile is in bulk agent and there is no current capability to use this bulk agent, except in a limited number of old aircraft carried spray tanks and some improvised mines, or perhaps as possible new munitions fill, if we had a facility to do it, which we do not.

I think I would also like to call your attention to the fact that we know the agent in our stockpile is deteriorating in all of our munitions, and this has caused some munitions to be of little military value. Age and deterioration is not going to stop, so you can expect to see continuing lessening of our current stockpile.

SAFEST CHEMICAL MUNITIONS STOCKPILE

Now our overall objective for the retaliatory element of our program, in addition to the defensive measures I have outlined, is to maintain the safest chemical munitions stockpile that denies a significant military advantage to any initiator of CW. Now with those objectives in mind, let me make a few points about this requirement.

First, it is not an attempt to match the Soviets on a round-for-round basis or in types of chemical munitions. Second, the requirement does not represent an increase in U.S. chemical agent stocks. On the contrary, it represents a move from an ineffective stockpile to a smaller but more militarily effective arsenal. And third, we are not trying to develop a capability to create a large number of casualties. Rather, our objective is to deter chemical warfare by being able to force an enemy to fight in his protective systems also, thus negating any advantage he would hope to gain from the use of chemicals.

Let me again stress that in my judgment, we do not have a credible retaliatory capability today, and without that we may be inviting the use of chemical weapons on our forces. I believe we have already delayed modernization far too long with the resulting risk being borne by the American fighting men on the battlefield today. Mr. Chairman, I would say that I believe his job is difficult enough without the enemy's unrestrained use of chemical weapons on him.

CRITICISM FOR STOCKPILE MODERNIZATION

As you know, the Army has been criticized for pursuing stockpile modernization. And in the course of this criticism, numerous reasons have been given for why we should not be producing binary munitions. Let me just address a few of these very briefly.

First, the reason which was referred to as the nuclear deterrent myth. To those who would say that it is immoral to use nuclear weapons but who in the same breath would wish to retaliate with nuclear weapons if chemical weapons are used against us. Chemical weapons can decisively change combat power ratios and thus alter the course of the battle dramatically, without resorting to nuclear weapons.

I am sure that the Soviets recognize this and for this reason have placed great emphasis on their ability to be able to conduct chemical warfare. The absence of this credible chemical retaliatory capability invites, then, the use of chemical weapons and it forces upon us early on a decision either to go nuclear or to accept defeat.

A second myth which we hear is that defense is enough or that a force with proper defense equipment negates the military value of chemical weapons; hence, chemical weapons would not be used. I just think that this assertion is simply preposterous and after seeing the people in the protective clothing this afternoon, I believe that you would agree that now and for the foreseeable future, our protective clothing is going to involve significant degradation.

It is also going to mean that on that chemical environment, a cracked eyepiece, a torn overgarment, or an improperly donned protective mask is going to be fatal to our soldiers. I think it is wrong to ask our soldiers and fighting men to have to fight with that handicap.

There is another myth, that is, that if we produce chemical weapons, there will be a proliferation of them. Well, all I would say to that is that we look and see what has happened in the past few years where we have exhibited restraint, the Soviets have continued to expand and improve upon their capability. Other nations have acquired the capability.

DEFENSIVE AND RETALIATORY CAPABILITY

In closing, let me simply say that we must have, I believe, both a sustaining defensive capability and a retaliatory capability in order to insure that we can properly discharge a U.S. policy of deterrence. Whether we like it or not, the reality of the day is that chemical warfare represents our greatest vulnerability. And I believe that with the sense of urgency and the great determination we must begin to change that toward our favor before it is too late. And with your continuing support we can and we will make that happen.

Thank you, Mr. Chairman.

Senator **WARNER**. Thank you very much.

Can the United States adequately test this binary system, and if not, do you think that is a reason for not going forward with it?

General **FULWYLER**. Certainly not, Mr. Chairman. As a matter of fact, that is a statement we often hear, that the binaries have not been tested. That is not true. The 155mm projectile, which is in the phase one of our project, we have had over 4,700 individual tests of that, and we have also been able to come up with simulants which closely resemble the actual chemical compound which will enable us to test that. This is not the problem.

Senator **WARNER**. All right.

Admiral, you can bring your witnesses in now.

STATEMENT OF REAR ADM. WILLIAM R. SMEDBERG, DIRECTOR, OFFICE OF NAVAL WARFARE

Admiral **SMEDBERG**. Yes. If you would, Captain Doyle.

I would start out, Mr. Chairman, by taking the opportunity to recognize on the part of the Department of the Navy that we share fully the views that have been expressed by the Secretaries and my service colleagues.

NAVY PROTECTIVE CLOTHING

In order that Chief Petty Officer Duffler does not have to spend too much time in that suit, I would only point out that there are some unique aspects of the Navy protective clothing: those having to do with the fact that we operate at sea in a moist environment and have essentially the same missions to perform while onboard ship as do the Army and the Air Force from the standpoint of handling planes, aircraft particularly.

The suit has the same general features. I do not believe we need to go over them any more other than to suggest that we can let Chief Duffler take the facepiece off and provide any comments which you might wish to comment on, Chief Duffler.

General **FULWYLER**. Notice the dexterity of getting it off with these gloves.

Admiral **SMEDBERG**. Chief Duffler, one of the points the committee is trying to get a feel for with respect to our ability to operate when we are dressed, to operate in a chemical warfare environment, is a feel for the percentage of degradation of the efficiency of our people when we are operating in the protective clothing.

I would add, Mr. Chairman, that Chief Duffler is at our damage control school in Philadelphia where we have our chemical warfare training as part of the damage control course.

Could you give any views as to the degradation that one finds with respect to that uniform?

Chief DUFFLER. Mr. Chairman, though there has been quite an improvement on this particular garment that I am wearing, it is very limited as far as your capability, especially in the movement of the arms, the fingers. You are required to wear three sets of gloves, three sets of socks, and your maneuverability is extremely limited. Also the fatigueness, the wearing of it for any length of time, 30 minutes or more, I personally have suffered heat exhaustion from the wearing of these particular garments in a training exercise.

Senator WARNER. How long did that take before you were debiltated? How long?

Chief DUFFLER. Thirty minutes, sir.

Senator WARNER. Thirty minutes.

Admiral, supposing we were escorting in an amphibious operation in the Middle East and it was for some reason unknown to us that chemical weapons had come into the hands of the adversary, and they had fired it offshore, and the support vessels landed the Marines and those giving naval gunpower, what would the Navy be able to do?

Admiral SMEDBERG. As you are aware, Mr. Chairman, we are now, just now outfitting all of the people on our ships with the chemical warfare protective clothing. We have not achieved that yet. Indeed, part of our fiscal year 1982 and our 1983 budget is to provide that capability to our ships at sea.

If we are in that environment, you will recognize also that the Marines play a major role in that environment. Our Marines in fact are outfitted with protective clothing. There is much research that we want to do to get their protective clothing much more facile as far as their being able to operate and land. Indeed, that is part of what the Navy program is all about being able to do.

Senator WARNER. Let us say it happens tomorrow morning. What are you going to do?

Admiral SMEDBERG. If it happens tomorrow morning, sir, if we have the opportunity, we will move upwind as fast as we can.

Senator WARNER. Hightail it in other words, right?

Admiral SMEDBERG. Yes, sir.

Senator WARNER. Our ships in terms of their design and ability to rid themselves of any chemical warfare agent that might be coming into contact with the ship, how does that compare with the Soviet ships today?

Admiral SMEDBERG. It compares very unfavorably, sir. They have in fact more recently designed what we could call protective collection systems for the citadel sort of concept into ships whereas we have that now going into new construction ships.

We have recognized this as a deficiency for some time, and of course recognize that it would be a tremendously expensive program, in the billions of dollars, to try to go back and retrofit. However, we know enough right now to recognize that we ought to be putting that into our shipbuilding program. Indeed, at this point in time part of our program is to retrofit into one of our major amphibious ships the LHA, a portion of that ship into a collective protection zone of citadel concept, but not the whole ship.

Senator **Warner**. What weapons systems do the Soviets have that could incorporate nuclear warheads—I mean chemical warheads?

Admiral **Smedberg**. We believe, Mr. Chairman, that there is hardly a weapons system that they have that does not have the capability to deliver chemical munitions.

Senator **Warner**. The parallel U.S. Navy, what systems do we have?

Admiral **Smedberg**. The U.S. Navy right now has the Weteye bomb, and that is it. That is the one that General Fulwyler addressed earlier that is not very safe to handle. It is the prime reason that we need to go toward the binary bomb which is safe to handle, stow, and operate.

Senator **Warner**. In recap then, the Soviets, almost every one of their naval weapons is capable of delivering a chemical warhead. We have nothing in the U.S. Navy except an air-deliverable Weteye bomb. My understanding is by naval regulations that weapon is not even permitted aboard the U.S. naval ships today.

Admiral **Smedberg**. We addressed that somewhat in our closed hearings today, sir. The Navy believes that it is dangerous from the standpoint of handling chemical weapons to have them onboard ship today.

Senator **Warner**. Fine.

Do your witnesses have anything further? I notice we have a marine here.

General **Fulwyler**. Sergeant Dupuis is down at our chemical school at Fort McClellan, too, and he is down there assisting.

Sergeant, maybe you would like to say something.

Sergeant **Dupuis**. Yes, sir. I am Sergeant Dupuis from the chemical school. I have had various training in use of the chemical outfit and protective clothing. I have been on two MED cruises, a NATO cruise, and a Caribbean cruise which took me all over the world, sir, such as working in Italy, working in Carbonaire, Spain, and such operations in Tunisia, Africa, and basically all over the world in cold and hot weather climates using the chemical protective clothing, sir. So I have done several surveys myself along with my superiors in evaluating the clothing as well as using the booties and protective clothing and the mask, and seen how well the Marines work in amphibious operations. We have done several land operations, sir, as well as being helolifted in in a chemical environment.

Senator **Warner**. What is your opinion, Sergeant?

Sergeant **Dupuis**. Sir, we need a lot of things done with protective clothing. The chemical protective clothing we have now is not that good for amphibious operations, as probably the people in the Navy can tell you. A lot of times if we get caught in high tide and someone has to drop us off a little bit farther from shore, and we get that chemical protective clothing wet when we may have gone a full MOPP to hit the shore, sir, it just does not do any good, because once you wet the chemical outfit it is just shot.

Senator **Warner**. How does that affect your ability to cope with getting ashore in high water?

Sergeant **Dupuis**. It will weigh you down. The outfit itself is waterproof from the outside, but once you have gone into the water, the water will come in, seep though the suit, and get your inside garments wet, such as your fatigues, sir, that you are wearing, and that will hold you right down. A lot of people have a good chance of drowning, especially with all the gear, and everyone has to take at least 100 or so pounds of gear in their sacks, sir, on their backs along with their weapons.

Senator **Warner**. Anything further?

Admiral **Smedberg**. Sergeant Dupuis, would you just give us your own estimate of what you think your degradation as far as when you are in the chemical warfare suit as opposed to when you are not in it?

Sergeant **Dupuis**. Going into a tactical situation?

Admiral **Smedberg**. Can you do your job 50 percent as well, 75 percent as well, or about what?

Sergeant **Dupuis**. We can probably do our job, sir, about 60 percent as well without the uniform as we can with the uniform. What I mean by that is if you go into a combat situation with your uniform on and approximately 40 percent of your capability is out there, sir. I do believe we do have the best uniforms in the world today as we can to maneuver with them. I know the Russian equipment cannot maneuver as well as we can in the tactical environment.

HEAT EXHAUSTION PROBLEM

The only problems we have had are the problems of heat exhaustion, mainly because of the mask. As the Sergeant said before, once you have that mask on your head, 40 percent of your heat is lost through your head. From wearing a hood over the mask a lot of people get dizzy, and they get hot, and a lot of people go down.

We have had people take the mask off or at least break the seal of the mask to get some air and allow them to feel 60 to 80 percent better in a couple of minutes. But when you are in a full MOPP going out there doing your job, sir, it is a hard job, especially with the mask, to see what you are doing. You will not have as good a vision to the side and the back as well as the front, sir, in trying to get visual recognition of anything out in front of you.

Admiral **Smedberg**. Thank you very much.

Senator **Warner**. Perhaps the chief should comment before he departs. If you have performed a damage control operation in that suit, of course it varies, but how long do you think you could work at it?

Chief **Duffler**. Depending on the situation. Naturally, in all cases, whether it be training or the real thing, they isolate the ventilation system in the interior of the ship. Once this is isolated, the effect of wearing the suit is tripled as far as your heat exhaustion, because the only thing you can do is sit there. If you just move around the slightest bit, the exhaustion is definitely going to set in. When the water washdown system after activation and the personnel exit these stations and start to clean up or monitor different areas, this is also detrimental to the person or wearer of the particular garment, because you go through the entire array of monitoring systems, and it does cause a great deal of discomfort and unwarranted feelings about the individual, because definitely the heat exhaustion will be present.

Senator **Warner**. Gentlemen, we thank you.

Any further questions from the Senators here of the person wearing the uniform?

[No response.]

Senator **Warner**. Thank you.

Had you finished, Admiral?

Admiral **Smedberg**. Yes, sir. I think we have covered everything in my statement by virtue of your questions that I had in mind to cover, sir.

[The prepared statement follows:]

Prepared Statement of Rear Adm. William R. Smedberg IV, Director, Naval Warfare

Mr. Chairman, Gentlemen, I am Rear Adm. William R. Smedberg IV, Director, Naval Warfare in the Office of the Chief of Naval Operations. I appreciate the opportunity to appear before this committee to discuss chemical warfare.

To be able to operate effectively in a chemical environment, we must: Detect chemical agents before they contaminate our ships; close up those ships to form a protective envelope; and protect shipboard personnel with protective masks and clothing.

As to procurement of defensive chemical equipment, in fiscal year 1982 we will concentrate on providing new items of individual protective equipment, detectors and antidotes for forces afloat. First priority will be given to the amphibious units. Procurement of these fleet defensive items will continue in fiscal year 1983. Further, a two zone collective protective system or citadel will be installed in an amphibious assault ship (LHA) in fiscal year 1983. Based on the results of this prototype system, we intend to further expand collective protection systems.

In that the objective of the U.S. chemical warfare posture is deterrence, the Navy has been involved in the development of a safer handling weapon—the Weteye binary chemical weapon. A binary weapon generates a persistent agent from two non-lethal chemicals, hence the name "Binary." Although binary weapons are not more lethal than unitary weapons, we believe that binary munitions are the most sensible way to establish a realistic deterrent because of their obvious advantages over the current unitary weapons in terms of safety, security, and transportability. Binary weapon technology is not a new development. It began in 1959 and continued until 1969 when a change in national policy suspended chemical weapons development. Bigeye is an aircraft-delivered chemical bomb whose components include a filled liquid agent cannister and a solid-filled container referred to as a "Ballonet." These two non-lethal agents are shipped and stored separately, eliminating the possibility of lethal agent formation prior to a mission requirement. The ballonet is loaded into the weapon shortly before flight and the mixing process is activated by the pilot just prior to release of the weapon.

The Bigeye program is a joint Navy-Air Force program, with the Navy designated the lead development service. The development is coordinated with the Army, the executive agency for Department of Defense chemical warfare matters.

In summary, Mr. Chairman, we firmly support the chemical warfare modernization program and are working to provide a force capable of deterring the Soviet use of chemical weapons. We view both our defensive enhancement capabilities and the production of the Bigeye weapon as equally important and necessary steps toward this goal.

Senator **Warner**. I think we should put in the record, General Fulwyler, more evidence with respect to the danger to our civilian population with respect to the transportation of some of these weapons.

If you had to go on alert tomorrow and move certain quantities of these weapons around, what danger is it to the American civilians?

STOCKPILE TRANSPORT SAFETY

General FULWYLER. Well, the current stockpile—I still maintain that we can move the current stockpile safely, and we have just demonstrated that with the Weteye bombs which we had to move from Colorado to Utah. Nevertheless, there are a number of public laws which greatly restrict what and when we can move, and therein lies much of the problem.

But at the same time, given the state of our current stockpile, that is what drives the concern not only of the Navy but all the rest of us, too. There is no question about it that when you are dealing with handling the current stockpile there are greater dangers involved than there would be with the binary which would be relatively safe.

Senator WARNER. When you say relative, it has been my judgment that it is safer by maybe a ratio of 100 to 1, is it not?

General FULWYLER. At least that, I guess. As an example, when we talk about two of the compounds that will be used in the binary, one of them is what we refer to as QL, I believe that QL has the same level of toxicity, for example, as caffeine. Another one of the precursors is similar to a commonly procured sulfur that is used throughout the United States all the time. Again, the compounds individually are relatively harmless, much more so than many of the products that you buy on your drugstore counter today.

Dr. GOLD. Senator, may I add to that?

The current stockpile can be moved safely but with a great deal of logistical burden. For example, the Air Force has a spray tank which weighs 2,000 pounds. To move it, that has to be put in a 4,000-pound shipping container to insure the safety standards. So it is not that it cannot be moved safely, but rather that moving it safely puts an enormous weight and logistical burden on it.

Senator WARNER. That is a good point.

Senator PRYOR. What sort of a spray tank? What spray tank do you have reference to?

General BURKE. This is the TMU-28/B, a device that is carried on the airplane to dispense the chemicals.

General FULWYLER. It is carried by the aircraft and at certain times released and gives a spray.

Senator WARNER. I am going to turn the questioning over now to my colleagues for a while.

Senator Nunn, Senator Pryor?

Senator NUNN. Mr. Chairman, I have had to miss so much I do not want to duplicate. I will defer to Senator Pryor, and I will try to catch up.

Senator PRYOR. Thank you. I will try not to ask many questions, Mr. Chairman, but I have on several occasions expressed opposition to us going back into chemical warfare production; and I think the chairman of this committee knows this, and I know these ladies and gentlemen here testifying understand this.

DEPLOYMENT OF BINARY MUNITIONS

But I do want to ask the first question relative to the deployment of binary munitions. And I wonder what advantage this country would gain in producing binary weapons if they could not be deployed in Europe?

Mr. PERLE. Senator, we do not assume that they could not be deployed in Europe, if we faced the situation that the Soviets are in Europe. Indeed, we would not rule out over the long term forward deployment to some extent in peacetime after appropriate consultation with our allies at some point in the future when they may be more receptive to that than we think they would be today.

Senator WARNER. We also have the point that I stressed earlier that there are many other scenarios worldwide than NATO where our troops are committed, and we might well be confronted with the possession of some type of chemical warfare by an adversary elsewhere.

Senator PRYOR. Is the binary production something that might not be postponed until we find not only where to deploy it but how to deploy it, this munition?

Mr. PERLE. There are ways to deploy these weapons when they are produced—and we are 2 years away from production——

Senator PRYOR. We have heard this argument on the MX for several years.

Mr. PERLE. If we had binary weapons today, we would incorporate in our planning methods for the deployment of those weapons in order to respond if necessary to the Soviet use of chemical weapons. I do not see that any purpose would be achieved by delay except extending the period of time during which we are unable adequately to respond to the Soviets use of chemical weapons should they decide to use them.

Senator PRYOR. So we are looking at a program to run to the end of this decade in which probably some, conservatively speaking, $6 billion to $9 billion would be utilized, and we do not know where and how to deploy that chemical warfare munitions today.

Mr. PERLE. Senator, I think the conjunction of those rather large numbers, which are larger than the program, with the binary weapons is misleading. Most of the money in this program, more than two-thirds of it will go for defensive equipment. The amount we are talking about for the production of the retaliatory capability is a small fraction of the $6 billion or $7 billion programed for the entire chemical program. But the fact is that we do not have to forward deploy those weapons in order to be in a position to use them if necessary in order to respond to the Soviet use of chemical weapons.

The alternative, Senator, is for us to be left in a position where the Soviets have the option of using chemical weapons, imposing the burdens on us that you just saw some evidence of to our forces, whose combat effectiveness is seriously diminished as a result of having to be in that protective gear. But without a credible response on our part, that affects our capability to fight a conventional war even if chemical weapons are not in fact used.

Senator PRYOR. How much chemical warfare—and I guess I will talk in terms of tons or tonnage—how much would be necessary to have a credible amount or a credible retaliatory response to the Soviets? How many tons are we talking about that you need?

Mr. **Perle**. I think we are in open session. I hope you will forgive me for not using a specific number. The program that is presently projected we believe to be adequate and not excessive, and as was pointed out earlier will actually result in fewer agent tons in the inventory than we have today. The problem with the inventory today is that it is not militarily effective.

Senator **Pryor**. Is it conceivable that we could accomplish the same purpose in our chemical warfare capability by basically refurbishing the present stock or the conventional stock we have on hand now, refurbish the present stock, thus eliminating the necessity of spending several billion dollars during the next decade?

Mr. **Perle**. I would like General Fulwyler to comment specifically on the costs and other aspects of attempting to use the existing agents in new weapons.

CHEMICAL WARFARE COST

General **Fulwyler**. Senator Pryor, given our current stockpile today, in order to refurbish that it would cost probably several times more than what the binary facility and its production will cost. Additionally, our only production facility of any capability for nerve agent today, as an example, has been out of operation since 1969. We estimate that it would take a number of years to get that on line and at very great cost. Then when we did that we would still have all of the problems inherent with the current stockpile that we have today except we would have more of them.

Senator **Warner**. You raised the point, and validly, about the transportation of these things, both diplomatically and otherwise, over to Europe. It seems to me we have this same deployment problem today with the existing inventory that we would with the binary inventory. Is that not correct, Mr. Secretary?

Mr. **Perle**. Yes, indeed. If it were necessary to bring quantities of chemical weapons to bear in a conflict, we would have the same underlying problem that we have today.

Dr. **Gold**. It would not be the same. It would be much worse.

Mr. **Perle**. Yes; we would have to move chemical weapons that, because of their very nature, would be exceedingly difficult to move safely. The logistic burden would be significantly diminished with binary weapons.

I must say I find it difficult to understand why we ought to refrain from utilizing the advantage of technology here to produce a weapon for retaliatory purposes that is an enormous improvement over the weapons presently in the inventory. They are safer, they are easier to move, they are more compact to move, they are less demanding in a logistics sense, and they are more effective on the battlefield.

BINARY SAFER THAN PRESENT MUNITIONS

Senator **Pryor**. Well, as one who has tried to read as much as I can about chemical warfare and the situation of our environment and needs, et cetera, I will accept the fact and I will certainly accept your argument that binary is safer to produce, to handle and to transport.

I also feel that the stockpile that we have of conventional warfare, chemical warfare is a stockpile that may not be as insufficient, as impotent as many have led us in Congress to believe. In fact, a GAO report of 1977—I think was the correct year—implied that the Department of Defense was not necessarily allowing this stockpile to deteriorate but was doing nothing to prevent its deterioration so that you would go into a new generation of chemical warfare.

I wonder if you might respond to that implication in the GAO report.

Mr. PERLE. I am not familiar with the details of the GAO report. I would be glad to yield to my colleagues or else provide additional material for the record.

But I wonder if the suggestion is that we can get along for the indefinite future with the existing stockpile. Is there a recognition that at some point we will need to replace it with weapons that are militarily effective?

Senator PRYOR. I think the less expensive course would be to try to see if we cannot work out some form of a verifiable agreement with the Soviets. But I do not think that a great deal of that has taken place.

Mr. PERLE. Well, we are trying, Senator. The problem has been that the Soviets had been reluctant even to discuss those minimum levels of verification that we believe are essential to have any confidence that they are in compliance with an agreement.

Senator NUNN. May I ask one question?

Senator WARNER. Why do you not come over here to this microphone, Senator Nunn.

Senator NUNN. Where does the second microphone go to?

Senator WARNER. It is piped out to the American public.

Senator PRYOR. That second one goes to Macon, Ga.

Senator NUNN. In that case, it will take me more than one question. [Laughter.]

Mr. Secretary, there was a recent article in the New York Times—and I do not know the exact quote—but it said something to the effect that the Soviets have proposed a ban on all chemical weapons. I believe that was a February New York Times article.

Are you familiar with any recent Soviet proposal as reflected in that article?

Mr. PERLE. I am not familiar with any serious proposal for a verifiable ban on chemical weapons, Senator Nunn. I think from time to time in various forums, especially international forums, when the Soviets make sweeping proposals, the seriousness of which we come to regard lightly.

VERIFICATION IS MAJOR PROBLEM

Senator NUNN. So the major problem is verification?

Mr. PERLE. It is indeed. In several discussions that were held, a dozen or so, in the period from 1977 through the summer of 1980 we were unable to elicit a positive Soviet response on the subject of verification. And they know as well as we that without intrusive measures of inspection that would go far beyond national technical means, it would simply be impossible to verify compliance with a ban on chemical weapons.

Senator NUNN. As I understand your position, assuming we can reach some kind of equitable and verifiable agreement with the Soviets, the administration would be willing to give up the production of binary weapons if we could reach the kind of agreement, is that right?

Mr. PERLE. Indeed. Our preference would be to solve the chemical weapons problem by eliminating them entirely so that we do not have to prepare either to defend against them or to be able to retaliate if they are used.

Senator NUNN. Do you anticipate that if we continue down the road committed to the production of binary weapons, which of course I have supported and continue to, do you believe that if we do that at some point in the future we are going to have serious negotiations with the Soviets?

Mr. PERLE. Let me say if we do not continue, if we do not modernize, that it is virtually guaranteed that we will not have serious negotiations. I am hopeful that when the Soviets come to understand that we are going to redress the imbalance that has developed in the chemical capabilities, at least to a degree sufficient to constitute a deterrent, that they will then reassess their own reluctance to seriously negotiate a verifiable ban.

KIND OF VERIFICATION NEEDED

Senator NUNN. This has probably already been covered, but just briefly my final question, what kind of verification do you think is necessary? Are you talking about onsite inspection?

Mr. PERLE. I think we would need onsite inspection. We would certainly need access to those production facilities that we believe are involved in the production of chemical weapons. You know, one can look at a canister or a tank that obviously contains a chemical from a number of different ways without being able to determine precisely what is inside that tank.

Senator WARNER. Senator Nunn, I am glad you brought it up, because we covered this earlier and pointed out that the one treaty which both the Soviet Union and the United States are now signatories to, and that is the one on biological, this Nation just determined it would not demand that onsite inspection; and as such, that treaty is unverifiable, and we are a signatory.

Now, passing on to discussions on the CW treaty, we have covered earlier, and I am glad you brought it up again, that the onsite inspection is an essential element, in the professional judgment of those who have testified thus far. And as I follow on to the questions of Senator Nunn, I mentioned earlier how at least four to five successive Chairmen of the Joint Chiefs of Staff, in successive years the JSC has urged the Secretary of Defense to permit production of binary weapons. And each time it has been the judgment of the President and the Secretary of Defense, Secretary of State, or others in combination not to let that go forward.

I went back and did some research, and I have here a letter, which I cannot release because it is classified, from a former Secretary of State to a Secretary of Defense explaining the reasons why in this budget cycle we could not go forward. And he states, in substance, that in his judgment to continue to forego plans for production would enable us to have a psychological advantage over the Soviets.

Now, we have gone the psychological route for some half a dozen or more years, and I have judged it is the conclusion of the present administration to take a more positive tack, and that is the substance of what we are doing right here in this budget right now, am I not correct?

Mr. PERLE. You are absolutely correct. I am familiar with the letter you have in mind, Senator Warner. I thought it was nonsense at the time, and the subsequent Soviet response had demonstrated that a psychological advantage was not of much use in getting them to change their ways.

And I see the statement being made today that we are in a position of moral superiority. Psychology did not work, and I am not sure that morality is going to work much better.

Senator WARNER. Very well.

Senator Pryor, do you have anything further?

Senator PRYOR. Once again, Mr. Chairman, I will just take a few moments.

Senator WARNER. Take as much time as you wish.

Senator PRYOR. I have seen so many figures on what we have in our stockpile, what has deteriorated and what has not, and what we are capable of delivering. And I will not pin you down to a number because I know the number of tons is classified, is that correct?

General FULWYLER. Yes.

Senator PRYOR. What about the number of canisters that I hear about. Is that a classified number?

General FULWYLER. I do not know what you refer to by "canisters." We have some other agent which is a bulk agent stored in what we call ton containers. The canisters which you may be talking about are the two canisters, for example, in the 155mm binary, that would constitute a part of the round.

Senator PRYOR. Well, once again, I may be getting into classified information, so I will not ask that question.

Senator WARNER. You may ask the question.

Senator PRYOR. How many canisters and/or containers do we have of CW in storage at this time?

General FULWYLER. There again, Senator, we do not store CW in canisters. We store it either in munitions——

Senator PRYOR. Let me ask in rounds. How many rounds?

General FULWYLER. That is classified, and I can provide you the classified answer. I can also provide you the classified figures on the status of the stockpile today, which I assure you is as accurate as we can give it.

Senator PRYOR. How many tons of—what is the kill factor, let us say, of a ton of chemical warfare? Now, I know the wind direction has to be correct, and the atmosphere, and how many people are around or what have you. But would there be some general statement on this?

General **Fulwyler**. There may be. I can look and try to provide that for the record. But I would hesitate to try to come to a specific number for the very reasons you state. It depends on the mode of delivery, on the climatic conditions that are present at the time, and how you actually deliver the munitions. There are many variables in there, and I am not sure that there is a general figure that would fit all of the scenarios that you might have.

Dr. **Gold**. It also depends very heavily on his protective posture, and that is why the basic thrust of our doctrine is not primarily to try to achieve casualties but to use chemicals to force them into protective gear.

Senator **Pryor**. Let us say the civilian population I assume will have no protective gear, so we are talking about massive numbers of civilians. I assume that answer is correct, is it not?

Dr. **Wagner**. Yes, sir. That is right.

DEGRADATION OF ARMED SERVICES

Senator **Pryor**. A great deal of this hearing, ladies and gentlemen, has been dedicated to the proposition of the degradation of the armed services, and we have seen three individuals here in protective clothing, and certainly I am led to believe that there would be a great effect of degradation.

How much have you asked for in the last 10 years that you did not receive from the Congress in your requests for defense dollars relative to the expenditure for protective clothing, masks, et cetera? Everything that you have asked for in defensive materials and protective clothing Congress has granted, is that not correct?

Dr. **Wagner**. I am not familiar with the numbers. My sense is that that has been largely true. I think the fact is that insufficient amounts were asked for. I think that we simply did not pay attention to this subject for many years.

General **Fulwyler**. Let me add, too, Senator, since I have been in this job, which is coming up to 3 years this summer, I believe that we have, in general terms, we have received everything we have needed, everything we have asked for in Defense.

STATE OF TECHNOLOGY OUTDATED

Part of the problem that I discovered and which is quite evident elsewhere in this particular area, is that it is the state-of-the-art, the state of technology today. Because we have had so little investment in it over the past 10 to 15 years, our state-of-the-art is behind the times. And what we have today represents the best that we can get today, but that is why starting last year and the year before, starting in 1979 we put a great deal of money into the research and development area to try to solve some of the problems that you saw here today.

Senator **Pryor**. A great portion of the request for the fiscal year 1983 budget is, I understand, for the demilitarizing or the destroying of the present stockpiles or research and development in that field.

Where are we there and how much progress have we made in trying to understand how we will destroy the present stockpile?

General **Fulwyler**. Yes, sir. I think that here is one area that we are making significant progress in. It also is a problem area where the basic problem has been the state of technology today.

Through the support of Congress we have a facility out in Utah now, a pilot project which is helping us derive the proper technology to enable us to get on with this national problem of getting rid of our leaking munitions and those munitions that we want to demilitarize.

I think that given what we know today we hope to be able to go forward with another demilitarization plant in about fiscal year 1984 to start construction. This would not have been possible had we not had the CAMDS project out in Tooele. We still have problems to solve there because we simply must be able to do the demilitarization in the quantity that we have to get rid of, which up until now we have not. As an example, today we have a little less than 700,000 munitions that are awaiting destruction.

ADEQUACY OF CURRENT STOCKPILE

Dr. **Gold**. Senator, may I just address the question that Senator Pryor raised earlier on the adequacy of our current stockpile?

Senator **Warner**. And also add in the implication, as I understood it, of the possible neglect of the stockpile. That question concerns us.

Dr. **Gold**. I did want to make sure the point got across that it is not just a matter of maintaining the current stockpile. There are very critical qualitative deficiencies in the stockpile. We do not have the capability to go against rear echelon targets. There is a relatively small number of bombs with nonpersistent agents. There are also a relatively small number of spray tanks which would expose the delivery aircraft to almost certain kill against modern air defense.

So it is not just a question of degradation of material and munitions, but there are serious qualitative deficiencies. And again, to deter him, to insure that he must operate in an encumbered environment, it is very important that we be able to attack him in depth.

Our stockpile today does not have that capability. No amount of maintenance will give us that capability, so that is something new that has to be done. It is not just a question of maintenance.

Senator **Warner**. The mismatch of the stockpile and the delivery systems, that is a very serious problem.

General Fulwyler, I think you put that in this open hearing. Have we not the mismatch?

DELIVERY SYSTEMS OBSOLETE

General **Fulwyler**. Yes, I believe so, Senator. One of the problems is that many of the munitions that we have are for delivery systems that have been going on in the inventory, and in indeed, a great percentage of our current stockpile are for delivery systems that we no longer have. They are absolutely of no value to us because we cannot deliver them.

Senator **Warner**. We are not talking about parcel post delivery.

General FULWYLER. I certainly do not want to be the deliverer if it is parcel post.

Senator WARNER. Well, since people are going to hear part of this program, when we talk about delivery we mean putting them in an actual artillery piece and firing it, and the artillery pieces to fire much of our inventory are no longer found in the forward deployed U.S. forces.

General FULWYLER. That is correct. And we are also finding—and I am sure General Burke would verify this—some of our air delivered weapons we would have trouble delivering with our modern aircraft.

Senator WARNER. Senator Pryor, any further questions?

Senator PRYOR. We are talking about the Soviet Union all the time having this capability and we are trying to more or less stay up with them, if not to pass them, or at least be somewhat equal to them and be able to respond. But how about other countries? How many other countries have chemical warfare capability?

General FULWYLER. I cannot go into that in open session, Senator, but we have indication there have been a number of new countries who have acquired this capability within the last few years. And again, let me make the point that we are not trying to match the Soviet capacity either in munitions or by the amount of agent itself.

Senator WARNER. You were speaking of countries in the Third World, were you not?

General FULWYLER. A number of countries.

Senator WARNER. The point is in Secretary Perle's statement he said the United States was the only member of our NATO allies.

General FULWYLER. Oh, yes.

Senator WARNER. And then we mentioned that France has the capability, but of course technically they are not a part of NATO. Now we are coming to another category, which perhaps should be referred to as Third World nations, which are indicating some capability in chemical warfare.

General FULWYLER. That is correct.

Senator PRYOR. General, would you characterize as more important to our national security and more of a deterrent to the Soviets, theater nuclear force modernization deployed in Europe or new chemical warfare stocks stored in the United States?

EXPENSIVE AND DANGEROUS SIGNAL

General FULWYLER. I could not give any "if" or "or," but let me quote what General Rogers said in testimony before this subcommittee about 2½ weeks ago. He said, for example, when considering the enhanced radiation weapon or the chemical warfare retaliatory capability that he thought that what we are doing on the binary now is the right signal to be sending to the Soviets.

I believe that both theater nuclear forces and a critical chemical retaliatory capability are essential.

Senator PRYOR. It is an expensive, dangerous signal. That is all I would say, Senator.

Thank you.

Senator **Warner**. I will look forward to our exchange on the floor of the Senate.

Senator **Pryor**. Yes; I am sure we will have one.

Mr. **Perle**. Senator Warner, I wonder if I might make this suggestion. I am entirely sympathetic to the position Senator Pryor has indicated, that it is an expensive program. We think it is the cheapest and most effective safe way of modernizing our chemical forces and at the minimal level necessary for deterrence. But there are a lot of scientists around who have been giving us gratuitous advice from time to time among the general public, and, Senator, I would like to extend an invitation, if you have an alternative program that can achieve our purposes and objectives, we would be delighted to sit down and have a look at it and see what it would cost, and see whether it can be done on time and on schedule, and see if it can meet the minimum requirements.

We all want to achieve the same objective, which is to make sure that these weapons are never used. And I, for one, would be delighted to look at cheaper ways of accomplishing the same purpose within the same timeframe.

We have come to the conclusion that there probably are none, but we are always willing to listen to helpful suggestions. So the door is open. We invite you to come on down.

Senator **Pryor**. And offer an alternative? I think President Reagan challenged the Democrats the other day to do that on the budget, and I think he is doing that here. Maybe I will come up with a program.

Thank you very much.

Senator **Warner**. The balance of the questions will be put in the record for response. I want to mention one, and that is that there is now a bill that has been introduced, S. 2078, which is designed to prevent the obligation or expenditure of funds for the production of binary chemical munitions. A comparable bill, H.R. 5608, was introduced into the House. And we would want the Department of Defense to comment at this time on the impact on our defense posture.

And I think beyond that we have now concluded 6 hours and 22 minutes in this hearing. That will go down in the record as a long one. I felt it was necessary that we go from closed to open session to enable the general public and others to be well informed on the need for this important program.

I compliment the witnesses for dedicating their full day practically to this subject and the very professional manner in which they responded to the questions and made their presentations. Questions for the record will be submitted.

[Questions with answers supplied follow:]

Questions Submitted by Senator John W. Warner

CREDIBLE CHEMICAL RETALIATORY CAPABILITY

Senator **Warner**. To the degree it is accurate to say the United States today has a credible chemical retaliatory capability, is it because of the quantity and capability of the munitions stockpiled in Europe, or is it because of the totality of that stockpile, the vast majority of which is stockpiled far from Europe?

Answer. First of all, the credibility of our chemical deterrent is in doubt. The Soviets today enjoy a significant superiority in chemical warfare capabilities and could gain a decisive battlefield advantage from chemical weapons use. Our comparative weakness in this area constitutes an invitation to use chemicals against us and, to the extent the Soviets believe they could win a combined chemical/conventional war, lowers our overall capability to deter war. The credibility of a chemical stockpile stems from two factors: (1) the fact that it exists in appropriate munitions and (2) our capability and resolve to use it in retaliation. The location of the stockpile has little bearing on the first element. What does have a bearing is that the total usable stockpile is less than [deleted] and by [deleted] primarily due to the phaseout of compatible delivery systems. Further, no effective capability exists to deliver persistent agent to targets beyond artillery range. Location does have an impact on the second element and the fact that some U.S. chemical weapons are forward deployed enhances the stockpile credibility. However, our movement capabilities are a major player in this equation, and binary munitions greatly simplify the movement problem. Our retaliatory credibility relies far more on the availability of weapons, anywhere, than on the precise location of the weapons. It will take years to redress our qualitative and quantitative deficiencies in weapons. It would take only hours or days to place a bomb located in the U.S. onto the first target, depending on choice of delivery means. The first artillery shells could be in theater just as rapidly. We fully acknowledge that the ultimate in deterrence would come from having the weapons physically located with the units designated to employ them. However, we consider this to be a relatively small incremental improvement compared to the major difference between no stockpile (or a totally deficient one) and a modern usable stockpile stored on U.S. territory.

TRANSPORTING WEAPONS TO EUROPE

Senator Warner. How long is it estimated to take to get those weapons stored in Germany out of the stockpile and distributed to U.S. forces in Europe? Do you believe the Soviets know where those weapons are stored, and is it safe to assume that stockpiles have been targeted by Soviet systems? Are there any weapons deployed with forces on a day-to-day basis?

Answer. It will take approximately [deleted] to complete the distribution of the toxic chemical munition stockpile to U.S. forces in Europe. Some U.S. forces could receive their chemical munitions as early as [deleted].

It would be prudent to assume that the Soviets know where the chemical munitions are stored in Europe and to further assume that this stockpile has been targeted by Soviet Weapons Systems.

There are no weapons deployed with U.S. forces on a day-to-day basis.

SOVIET FIRST USE

Senator Warner. What would be the release authority required for line officers to employ chemical weapons in responding to a Soviet first use? Would it be comparable to that required of nuclear weapons? It is reasonable to expect that, in the heat of battle, should the Soviets employ chemical weapons against U.S. forces, that local commanders in the field would authorize retaliation in kind—with or without authorization from duly constituted authorities?

Answer. The use of chemical weapons by the armed forces of the U.S. requires the approval of the President. This is comparable to the use authorization required for nuclear weapons; although release is more restrictive in that there is a specific U.S. policy and a treaty commitment barring "first use" of lethal or incapacitating chemical agents. It is not reasonable to expect that U.S. commanders would disobey their orders in this regard.

ON-SITE INSPECTION

Senator Warner. It has been said that on-site inspection would be absolutely essential to a verifiable arms control agreement banning the development, production or stockpiling of chemical agents and munitions. Do you agree?

Answer. Yes. The nature of these particular weapons makes some form of on-site inspection essential. National technical means alone cannot adequately detect or monitor the munitions, their related production facilities or the range of diverse activities associated with chemical weapons which, if occurring, could be indices of treaty violations.

Senator Warner. Have consultations taken place between the military and civilian members of the Department of Defense and U.S. civilian chemical manufacturers to insure their cooperation and compliance with on-site inspection requirements should they prove to be acceptable to the Soviet Union?

ANSWER. When the bilateral negotiations with the Soviet Union got underway, U.S. government officials consulted with a few selected chemical industry representatives. Since the bilaterals made no real progress with respect to inspection provisions, such consultations were not extensive. Should there be any progress toward a treaty in the future, consideration of the impact of treaty measures on the U.S. chemical industry would, of necessity, be explored further.

Senator **WARNER.** Is there any evidence that the Soviets have modified their adamant stance against such mandatory on-site inspection provisions?

ANSWER. Absolutely none. Indeed, their present positions on verification and compliance are remarkably unchanged from those contained in a draft CW Treaty that they tabled in the Conference of the Committee on Disarmament almost ten years ago.

IDENTIFYING INDIVIDUAL STOCKPILE WEAPONS

Senator **WARNER.** Would you explain the techniques and definitions used for identifying the status of individual weapons within the stockpile? For example, when is a munition listed as being unserviceable? To what degree does the serviceability of munitions depend upon so superficial consideration as the painting scheme and need to fit the weapon with a fuzing system? What proportion of the stockpile is made up of such weapons today?

ANSWER. The terms used to describe the utility of munitions within the stockpile at the DOD level are: Ready for Issue; Repairable; and Unrepairable/Obsolete.

Ready for issue means that the munition requires no maintenance which would preclude its use. Today, munitions containing about [deleted] of agent are in this category.

Repairable means that the munitions require some effort before the munition can be issued for use. Chemical munitions are inspected and classed by standard ammunition condition codes by quality assurance specialists, as are all ammunitions. These condition code specifications include some items which might be called superficial by a policy maker, but which are not superficial to a serviceman who might have to use the munition. Today the munitions in this category contain about [deleted] of agent. Of this amount, about [deleted] are in munitions which require only reinspection or very minor maintenance prior to issue. For example, the majority of these are mustard munitions that contain tetrytol bursters which become unsafe with age, and each round must be opened and inspected for signs of deterioration prior to issue. If no deterioration exists, then the round may be issued. If deterioration exists, then the round cannot be used.

Unrepairable/Obsolete means that the munition cannot be repaired in an economical fashion, or that the munition no longer has a useful function (e.g., M55 rockets for which M91 rocket launchers no longer exist in the force structure). Today, about [deleted] of agent are in unrepairable/obsolete munitions, i.e., about [deleted] of the existing munitions in our stockpile cannot be repaired for use.

It is important to realize that the quality assurance inspection program for conventional ammunition relies upon test firing older munitions. Chemical munitions have not been test fired since 1969, and cannot be fired with current restrictions. Deterioration of the chemical agent is occurring, with resultant effect not only on weapon effectiveness, but more seriously, to an unknown extent upon the internal structural integrity of the munitions. The thirty or more year old mustard rounds may have impurities settling out of the agent. This phenomenon, called "heeling," potentially affects the ballistics of the rounds involved. The conclusion from these facts is that the existing unitary munitions are becoming increasingly unsafe to use in combat. One of the many advantages of the binary concept is that testing of the metal parts of the round can be performed without formation of toxic agent.

U.S./SOVIET STRATEGIC RELATIONSHIP

Senator **WARNER.** I happen to think the historical context of many issues involving U.S.-Soviet relations is an extremely important one to the proper understanding of those issues. We started off this series of hearings with a review of historical background to the strategic relationship between these two countries and I think it would be helpful to have a comparable review of that context as it relates to Soviet and American experience with chemical warfare.

ANSWER. Both the United States and Russia were exposed to chemical warfare in World War I; however, the experiences of the two countries were considerably different. The United States entered the war relatively late, employed fewer chemical munitions than any other major combatant and suffered relatively few chemical casualties (about 73,000—of which only about 1,500 were fatalities). The Russians, on the other hand, are believed to have suffered more chemical casualties than any other nation and more chemical fatalities than the other combatants combined (about 475,000—of which about 56,000 were fatalities). We believe that this experience had a major impact on the Soviets following their takeover and provides at least part of the rationale for their chemical program today. Both nations were involved in chemical warfare investigation and preparations between the wars. The Soviets cooperated closely with the Germans during that period. During World War II, neither nation used chemical weapons, although both were capable of doing so. Following the war, both the United States and the Soviets acquired information on German nerve agents. In the case of the U.S.S.R., an entire German nerve agent plant (complete with personnel) was relocated to the Soviet Union. From the end of World War II into the 1970s, the United States had nuclear superiority over the Soviets. The Soviets may have viewed chemical weapons as a way to offset this nuclear superiority, which may be an explanation for their strong chemical warfare program. They have developed a substantial capability to wage chemical warfare which includes a large, well-trained force of specialists, large quantities of protective equipment, a wide variety of chemical agents and delivery means, and comprehensive doctrine and training. In contrast, in the late 1960s and early 1970s the United States virtually abandoned chemical warfare activities, both defensive and retaliatory. It was not until the state of Soviet preparations became apparent following the 1973 Arab-Israeli war that U.S. policy makers become alarmed and efforts were begun to equip and train U.S. forces to survive and operate under chemical warfare conditions. Protective preparations are continuing at an accelerating pace; however, little has been done to improve the equally essential retaliatory component of our chemical capability. The useable stockpile of chemical munitions is declining due to the phaseout of compatible delivery systems and the deterioration due to age.

STOCKPILE TRANSPORTATION REQUIREMENTS

Senator **Warner**. Would you provide, by way of comparison to the data submitted in response to Senator Hart's question, a breakout of the transportation requirements associated with moving our present stockpile to Europe?

Answer. During contingency operations, once permission has been obtained to move lethal chemical weapons, the theater commander-in-chief will decide that portion of the available stockpile he wishes to call forward. His desires, in conjunction with the condition of the munitions at that time, would dictate the quantities to be moved and the commensurate transportation requirements.

It is possible to compare the movement of unitary munitions with that of binary munitions. When shipped by air, unitary munitions must be transported aboard a Military Airlift Command (MAC) Special Assignment Airlift Mission as in the case of nuclear weapons. The cost of these special missions is quite high. Furthermore, there are numerous safety requirements associated with the movement of unitary chemical munitions. Binary weapons, on the other hand, contain only an industrial type chemical and a small explosive burster and as such, are inherently safer. As a result, they can be moved as conventional explosives, such as small arms ammunition. The two components of these weapons can be shipped via sea in separate fore and aft compartments of Military Sealift Command vessels for a fraction of the cost of special air transport. Even if air transport were required, binary munitions could go on a regular, less expensive MAC channel mission. When the airlift requirements for the two types of munitions are compared, it is found that the additional lift needed to transport canisters for binary artillery rounds closely equates to the space which is lost for movement of technical escort teams and decontamination equipment with unitary munitions. For persistent agent, air delivered munitions, there is a considerable advantage to the binary Bigeye bomb.

The following table shows the number of chemical rounds (binary and unitary) that could be carried per C–141 sortie to Europe. It then, for example only, shows the number of C–141 sorties required to transport a significant quantity to Europe. For binary systems this computation includes the airlift for the second component.

Type	Number of rounds	Number of sorties	Rounds moved
155mm, unitary	504	40	20,000
8 in, unitary	204	98	20,000
155mm, binary	608	40	20,000

Type	Number of rounds	Number of sorties	Rounds moved
MC-1 bomb, unitary	54	19	1,000
TMU-28/B spray tank, unitary	8	125	1,000
Bigeye bomb, binary	60	20	1,000

Note.—In terms of military utility/role and agent fill, the Bigeye bombs should be compared with the TMU-28/B spray tank rather than the MC-1 bomb, which is incapable of forcing adoption of long-term restrictive protective measures.

Senator **Warner**. If we were to go to war tomorrow in Europe, what proportion of that stockpile currently deployed there would be immediately available? What risks would attend the immediate distribution of these weapons to the troops?

Answer. As a result of an extensive maintenance and survelliance program, [deleted] of the munitions in the deployed chemical stockpile in Europe are ready for immediate issue and would pose no special risks if distributed to the units. If an accident occured during the distribution process or the munitions were damaged by enemy fire, obviously there would be a risk associated with any leakage of agent and we have plans to reduce such hazards. Modernization of our stockpile with the safer binaries would eliminate such risks because the actual agent is not produced until the binary munitions are fired.

CHEMICAL-RELATED EQUIPMENT POOR

Senator **Warner**. It has been alleged by some that the experience of the U.S. Army's Chemical Corps in the development and production of chemical-related equipment and weaponry has been so poor as not to inspire confidence in the ability of this branch of the Service to undertake successfully important new developments being proposed like the 155mm shell, a new generation of chemical protective and decontamination gear and medical equipment.

Would you comment on this allegation? Would you respond in detail for the record to suggestions that the experience with the TAB antidote, the M-8 alarm, lewisite agent, chemical masks, and rocket munition, all suggest a pattern of mismanagement and blundering on the part of the Chemical Corps?

Answer. First, I think it important to recognize that the technical branches were eliminated by Secretary McNamara in the 1962 timeframe; consequently, the management of this program has not been the exclusive prerogative of even chemical officers for the last twenty years. If there are criticisms to be made—and there are—I too make them, the criticism should be directed at the Army as a whole. It must also be remembered that in the early 1970's, the career specialty for chemical officers was almost eliminated—and I can assure you that the effort wasn't pushed by those who knew and understood the Soviet threat. It was not until the late 1970's and early 1980's that the required funding and resources started being applied to a program which had languished for nearly a decade.

Now let me address some of the criticism which has been raised, paradoxically by some who were in part responsible for the program in the 1960's and 1970's. Criticism can be healthy, particularly when it contributes to progress. Criticism which is only testimony to hindsight or "I told you so," is not.

With respect to the antidote TAB, the M-8 alarm, or any item, I would ask anyone who is being critical or proposing mismanagement, who has a better antidote, who has a better alarm, and who has a better proposal for a chemical munition to come forward with their proposal. The fact that the Army wants to field a new generation of antidotes or defensive equipment which meets the changing threat with advance technology, is not saying that we could have had better equipment ten years ago if we had only managed better. What is being said is that we now believe we can make needed improvement using the state-of-the-art technologies. Indeed, we are now creating the state-of-the-art in some areas.

With respect to management per se, with the increased challenge presented by an expanding program, we are relooking at every facet of the program's management to assure that we have the required organization.

BINARY WEAPONS

Senator **Warner**. Is there any question in your mind that the introduction of binary weapons into the inventory and the retirement and destruction of basically unusable bulk-stored agent and obsolescent unitary munitions will result in an improved deterrent value to the U.S. chemical stockpile?

Answer. No, without doubt the introduction of binary weapons into the inventory and the properly phased retirement and destruction of basically unusable bulk-stored agent and obsolescent unitary munitions will result in improved chemical warfare deterrence and incentive for a realistic verifiable ban of all chemical munitions.

LIVE AGENT TESTING

Senator **Warner**. Does the administration believe it is in the national interest to resume live-agent testing of chemical weapons in open air experiments? Has the State of the Art in simulant testing and monitoring progressed sufficiently far that we can have extremely high confidence in the data produced by such tests without engaging in live-agent experimentation?

Answer. We do not believe it is essential to resume open air live-agent testing of currently planned chemical weapons. We have high confidence in the simulant testing programs. Live-agent testing could help us fine tune our weapons effects data. However, we are now certain that the weapons meet their military objective of being able to force the initiator of chemical warfare to adopt similar restrictive protective measures to those he forces on us by his chemical first strike. It is much more likely that open air live-agent testing might be needed to achieve high confidence in some of our projected protective systems. Examples include the XM-16 Jet Engine Exhaust Decontamination Device, which is too large to test in a chamber, and large area remote detector systems, which are intended to alarm to agent clouds several kilometers away. However, if we must continue to rely upon the existing stockpile of munitions without replacement, it will be essential to have firing tests to ensure the safety of the old munitions.

BINARY 155MM ROUND

Senator **Warner**. Mr. Saul Hormats, former Director of Development of Chemical Weapons for the Army, has expressed profound reservations about the testing program for the binary 155mm round. He has expressed the opinion that "engineering data must be obtained on cloud-size and shape, rate of formation, yield, droplets, size, distribution, persistency, etc., statistically and dynamically and in statistically significant numbers. These must be with live, not simulant rounds." He goes on to say that "to embark on a multibillion-dollar production program without the above testing, would be a criminal waste of money." Would you comment on these allegations and the extent of testing to which the 155mm binary rounds have been subjected? Why is it that the Army feels it can proceed with confidence into production of these weapons without undergoing live testing?

Answer. First, let me emphasize that the Army does not consider live agent testing of the 155mm binary munition necessary. The 155mm GB-2 artillry projectile was type classified in 1976 after extensive field and laboratory testing. A total of 2,758 projectiles were test fired during the development program. The included extensive evaluation of the agent dissemination characteristrics, flight performance, and hardware integrity. Other tests utilized simulants in lieu of binary precursor chemicals.

To insure the adequacy of simulant testing, 17 simulants were evaluated and 82 firings were conducted to validate the simulant technology. To correlate simulant testing and demonstrate the binary concept for GB nerve agent, 340 reactor tests of scaled-down 155mm projectiles and 43 full-scale tests were conducted in an environmentally controlled chamber. Of these, 347 tests utilized the actual binary precursor chemicals to produce GB nerve agent. These tests demonstrated that formation of GB from binary precursor chemicals was highly reproducible, predictable, and efficient.

The reliance in simulants in place of actual binary precursor materials in field testing the 155mm binary projectile was also confirmed by an independent scientific evaluation.

Indeed, the ability to utilize simulants for testing versus the actual agent is in itself a major advantage of the binary concept. Finally, I would like to clarify the cost associated with the 155mm binary program. It is not a "multibillion dollar" program. The cost to produce the required number of 155s is approximately $350 million.

BILATERAL CHEMICAL ARMS CONTROL AGREEMENT

Senator **Warner**. Is the United States no longer seeking to achieve a bilateral chemical arms control agreement with the Soviet Union? Is the only effort currently planned for such disarmament agreement one conducted on a multilateral basis? What forum does the United States plan to use for pursuing this multilateral treaty? What is the rationale behind this change of venue?

Answer. The goal of U.S. policy is to eliminate the threat of chemical warfare by achieving an effective, comprehensive and verifiable prohibition of chemical weapons. After more than three years of intensive effort, the U.S.-Soviet bilateral negotiations have lapsed due to Soviet intransigence on verification, as well as on CBW use and Biological Weapons Convention compliance issues. U.S. CW arms control efforts have shifted in focus from bilateral to multilateral. We are currently participating in the elaboration of a CW convention in the forum of the 40-nation Committee on Disarmament in Geneva, stressing at every opportunity the critical issues of verfication and compliance.

WAR GAME EXERCISES

Senator **Warner.** Mr. Perle, I understand that you participated in a wargame recently, in which the use by the Soviet Union of chemical weapons against air assets [deleted] had a profound effect [deleted]. Can you elaborate upon this experience and other wargame exercises which chemical weapons has had a important tactical utility?

Answer. You may have in mind an exercise in which I participated some time ago. I do not recall the details of the play sufficiently to elaborate on the reference I made in my March 15, 1982 testimony. As a general observation, however, I would note that chemical weapons do prove to have tactical utility in wargame scenarios. Their use can be limited to the immediate battlefield or involve theater-wide strikes on a full array of targets. They can be used—with synergistic effect—to produce casualties, to disable defenses, to paralyze nuclear capabilities, to render logistics areas, ports and equipment depots inaccessible and to force defenders into a protective posture.

UNSERVICEABLE WEAPONS IN STOCKPILE

Senator **Warner.** What is the number of weapons currently in the stockpile that are listed as unserviceable because of leaking or questionable safety? Which weapon systems have been associated with largest leakage problem and what is being done to eliminate them from the inventory?

Answer. There are about [deleted] munitions which have been identified for demilitarization. Of this amount, over 1,150 munitions are awaiting demil because they have been determined to be "leakers." Since the "leakers" have been containerzied, they do not pose a safety hazard in storage.

The major portion of the munitions awaiting demil are the M55 rockets—nearly 500 thousand. These munitions are in demil status for two reasons. First, because their delivery system—the M91 rocket launcher—is no longer within the force structure; and secondly, because of their physical deterioration, they are leaking in greater numbers than any other munition. In storage, they do not pose an unmanageable safety problem, since each rocket is packed in its own sealed shipping container.

There are two systems which have been developed to demil chemical munitions—the Drill and Transfer System (DATS), and the Chemical Agent Munitions Disposal System (CAMDS). DATS is a transportable system designed to handle defective munitions, to include "leakers" at their storage location. DATS does not destroy the agent or the munition; it merely separates the two and allows for the safe storage of the agent until it can be destroyed by other means. DATS completed its first operational mission at Pine Bluff Arsenal, Arkansas, in June 1981. It is currently at Anniston Army Depot, Alabama, CAMDS is a prototype system designed to develop and demonstrate advanced procedures and equipment for large scale demil. To date, both the CAMDS and DATS system have destroyed over 13,000 M55 rockets.

Because of their age, the 105mm GB munition is the next most likely munition to experience significant number of leakers. Understanding this, the next phase of CAMDS will demonstrate the demilitarization process for 105 mm munitions.

Senator **Warner.** Is it not the case that particluarly attractive targets for the Soviets to use chemical weapons against are the assets they would like to deny the use of to the United States and its allies but would not necessarily want to destroy, and thereby preclude their own forces from subsequently making use of them? I am thinking of such inviting targets as airfields, port facilities, POL depots, POMCUS'd ammunition and other stores, etc.?

Answer. Yes, these are good examples of attractive targets to the Soviets. The immediate military goal of hampering operations and precluding efficient use of these facilities may be more of a factor in motivation than planned future Soviet use, particularly in a non-nuclear war.

REAR-ECHELON TARGETS

Senator **Warner**. Would you describe the U.S. current capabilities to project chemical attacks against rear-echelon targets? Is this lack of capability one of our greatest deficiencies? What steps are planned to redress this deficiency and can anything be done to accelerate the production of the Bigeye bomb for this purpose?

Answer. One of the most serious deficiencies in the current chemical capability is the inability to force long-term degradation on real-echelon targets. The bulk of our chemical weapons capability is made up of relatively short-range artillery shells. There is a relatively small number of bombs available; however, they are all filled with the non-persistent nerve agent GB, which quickly dissipates. To degrade key targets, such as airfields, command and control facilities, and logistics centers, requires persistent agents to contaminate areas, facilities, and supplies. These force personnel to adopt restrictive and time-consuming protective and decontamination measures which significantly degrade unit capability. The persistent nerve agent VX is a good choice for this role; however, the only long-range delivery capability we have for VX is a [deleted] number of aircraft-carried spray tanks. [Deleted.] The Bigeye bomb will contain binary VX and will allow the use of more survivable aircraft tactics. The Bigeye program has been accelerated to the maximum extent deemed prudent. To further address this problem, the emphasis of future development efforts is expected to be on longer range systems and on standoff weapons which will reduce the need to penetrate terminal air defenses.

SOVIET CHEMICAL MILITARY ACADEMIES

Senator **Warner**. In your previous appearance before this subcommittee, we discussed the fact that the Soviet Union has several military academies—comparable to our own service academies—in which young military officers take a four-year course to prepare them to be specialists in chemical warfare. have you had an opportunity to research this issue further, and if so, what additional detail can you provide the Committee on the magnitude of the Soviet effort in this regard?

Answer. The three primary higher officer schools or military chemical academies produce chemical officers for the Soviet Army: Saratov Higher Military Engineer School of Chemical Defense, Tambov Higher Military Command Red Banner School of Chemical Defense and Kostroma Higher Military Command School of Chemical Defense. Saratov prepares engineer officers for duty with the chemical troops after a five-year term of study. Graduates are commissioned as "Lieutenant-Engineer" and are qualified as "Engineer-Chemist." Tambov and Kostroma prepare officers "of a command profile" for chemical duty after four years of study. These programs certify the graduates in the operation of chemical weapons and means of defense. The Military Red Banner Academy of Chemical Defense imeni Marshall of the Soviet Union S. K. Timoshenko provides a chemical education for selected officers of the Soviet Army and Navy as well as foreign officers. In addition to command courses, refresher courses and graduate level programs for chemical officers from the three higher chemical schools, the Timoshenko Academy provides a special facility for high level command post exercises which include offensive employment of weapons of mass destruction. Other chemical institutes (military related) accept students who sign up to be trained as chemical officer platoon leaders. Timoshenko, it should be noted, offers a variety of courses, one of which is a five-year program which is a candidate degree course that confers a Master's and Ph.D. Other courses are Senior Officers of Chemical Troops course (28 months), advance course for chemical service officers (30 months). Training divisions are found in each Military District in the USSR, and the NCO schools are usually subordinate. A chemical NCO is trained in a six-month course at a chemical training battalion. By the time the average Soviet youth has reached draft age, he has received over 100 hours of civil defense and premilitary training, which includes the use of military CBW protective, detection, and small items of decontamination equipment.

PURPOSE OF CHEMICAL WEAPONS

Senator **Warner**. Is the primary purpose of chemical weapons, in your opinion, the casualty-producing effect or is it, rather, the ability these weapons have for degrading an adversary's combat effectiveness by forcing him to operate in a restrictive chemical protective posture?

Answer. To us the primary purpose of chemical weapons is to deter the use of chemical weapons against us. Their military utility is to force the initiator of chemical warfare to adopt similar restrictive protective measures to those he forces on us with his chemical first strike. It is possible to achieve high protection levels from chemical agents and reduce direct casualty effects. Protective equipment and procedures severely degrade unit effectiveness. Degradation increases with temperature and the length of time forces must remain buttoned up, and may be especially severe for some critical skills such as flying fighter aircraft. Decontamination and protective equipment resupply direct critical time and resources away from the combat mission. If chemicals are used by only one side, the user gains a decisive advantage. If both sides have a chemical weapons capability, a potential user is likely to perceive little advantage from chemical use because he would have to also adopt protective measures—and thus be deterred. This is not to say that the casualty effects of chemical weapons are insignificant. There will always be some casualties due to equipment failure or exposure before protection can be donned. The Soviets view chemical weapons as highly effective casualty producers and believe they can achieve high casualty rates against protected forces because of surprise and deficiencies in the defenders' training and equipment. Our developing doctrine, however, stresses the degradation effect.

ASSURANCE OF DETERRENCE LEVEL

Senator **Warner**. Would you describe in detail for the record the means by which the Joint Chiefs of Staff arrived at the number [deleted] as a reasonable assurance of deterrence level. Would you comment also in detail on the allegations made by some critics that there is no way the U.S. could expend anything like [deleted] of ammunition in the space of [deleted] war. Is that [deleted] figure a product of calculations taking into account rates of fire, mix of conventional high explosive and chemical rounds, personnel fatigue, logistical support, etc?

Answer. The current JCS estimate of a prudent worldwide binary stockpile to sustain combat for [deleted]. The JCS tasked the Theater Commanders in Chief (CINCs) to provide their chemical requirements based on their analysis of potential targets, weapons effects, and their capabilities to deliver chemical munitions. Two target damage criteria were provided: (1) casualty production and (2) degradation of the targets' performance. In General, the CINCs chose the later criterion which requires less munitions. Further, the following restriction was added, "Greater than negligible risk to major civilian downwind population centers from downwind hazard will preclude attack of a target with chemical munitions."

Using the JCS guidance, the CINCs analyzed their target base and military objectives and developed chemical munition requirements. The methodology used by the European Command was typical of this analysis. The requirement was based on one-time attacks with chemicals against specified targets and a [deleted] back up stock for reattack based on delivery capability. The following table lists the targets, weapon of choice, and criteria.

[Deleted.]

Most other CINCs used a methodology similar to the above. However, Atlantic Command and the RDF lowered their requirements based on their limited resources to deliver chemical agents, rather than submit a higher figure based on the number of suitable targets.

The Department is continuing to evaluate the ultimate stockpile requirement in terms of quantity, agent, and weapons systems. However, we have no doubt that the present stockpile is inadequate and that the two presently planned weapons are necessary components of any future binary stockpile. It is very important to note that our procurement plan for binaries will procure less than [deleted]. The stockpile will not reach this level until some time later because of procurement lead time. The remaining usable unitary munitions will represent only about [deleted]. Consequently, there is ample time and flexibility to refine binary requirements, capitalize on advancing technology, and pursue chemical disarmament without being locked in on an ultimate stockpile figure.

Senator **Warner**. You have said that your intention is to provide a stockpile smaller in quantity than that currently maintained by the United States. Others have pointed out that while it may be smaller in quantity, the number of usable weapons would be greater than that currently maintained. Would you comment?

Answer. The contemplated binary stockpile will be less both in terms of the total number of munitions and in the total amount of agent than the present unitary stockpile. This would be true even if we were to procure the full JCS [deleted] requirement for US and allied forces. There are no current plans to procure binary weapons for allied forces, and any decision to do so would depend on consultations with the allies involved. Regarding the issue of usability, the major deficiency of the current stockpile is its inadequate and declining military utility. The binary stockpile will consist of modern weapons, specifically designed to meet current and projected military needs; consequently, it will have greater military utility than the current unitary stockpile.

U.S. STOCKPILE DEPLOYABLE OUTSIDE THE UNITED STATES

Senator **WARNER**. How much of the current, usable U.S. retaliatory stockpile is currently deployed outside the continental United States? Specifically, how much of it is stored in the Federal Republic of Germany?

How long would the quantities stored in West Germany supply U.S. forces in Europe requiring such a retaliatory capability?

Are any U.S. chemical weapons stored elsewhere in Europe?

ANSWER. Of the ready to issue or repairable retaliatory stockpile, there are about [deleted] on Johnston Island and about [deleted] in the Federal Republic of Germany. There are also [deleted] of bulk agent on Johnston Island. There are no other U.S. chemical weapons outside the continental United States.

General Rogers, Supreme Allied Commander, Europe, estimates he has a [deleted] chemical artillery shells for U.S. forces in Europe. The days of supply would [deleted] U.S. chemical weapons for use in response to Soviet or Warsaw Pact first use. [Deleted.]

DEGREE OF CASUALTIES

Senator **WARNER**. To what degree do you believe the casualties likely to be experienced by civilian population down-wind from the sites of chemical attacks may experience the bulk of casualties inflicted by the use of such weapons?

Do you believe that such casualties will be disproportionate to casualties likely to result from exchanges involving tactical nuclear weapons?

ANSWER. There is a high risk of civilian casualties from chemical warfare. Chemical weapons have the potential to kill large numbers of unprotected civilians, and our objective is to prevent their use. Should deterrence fail, U.S. chemical doctrine emphasizes great care in the use of chemical weapons to reduce risk to civilians. However, we have no evidence to indicate either that the Soviets share our concerns about chemical warfare or that they would be constrained by the prospect of massive civilian casualties among their enemies. In fact, evidence from Southeast Asia and Afghanistan is that civilians have often been specific targets of Soviet, or Soviet-sponsored, chemical use.

It is difficult to speak of disproportionate civilian casualties. The intent of our chemical deterrence program is to avoid all chemical warfare related casualties by removing the significant military advantages of an initiator. Thus even if there is war, our deterrence program would provide realistic reason for there not being chemical warfare.

U.S. CHEMICAL WARFARE POSTURE

Senator **WARNER**. I understand that Dr. Matthew Meselson of Harvard provided a classified response to the Defense Science Board's Summer Study of U.S. Chemical Warfare Posture. Would you supply that document for the record along with any comments thereon available from the Department of Defense?

ANSWER. As you know, Dr. Meselson's comments on the 1980 Defense Science Board Report appears on pps. 5061–5065. I would also like to provide a copy of the Defense Science Board's Final Report on the U.S. Chemical Warfare Posture for the committee files. The Department of Defense comments on the Defense Science Board Study follow:

DEPARTMENT OF DEFENSE COMMENTS ON DR. MATTHEW MESELSON'S COMMENTS ON THE DEFENSE SCIENCE BOARD SUMMER STUDY

Dr. Meselson plays the role of devil's advocate well, providing feasible objections to the conclusions of the Defense Science Board [DSB] Report, even if some objections are inconsistent from point to point. Full debate is needed and welcome to fully consider such an important issue as the need to reestablish a chemical retaliatory capability. However, there are some errors in fact presented by Dr. Meselson as well as misunderstandings as to the intent of the DSB which require the following comments (which are keyed to Dr. Meselson's format).

Para. 1.1. Soviet Threat.—Dr. Meselson's knowledge is incomplete since he had only a SECRET clearance for two days to review the report and no access to special intelligence. Although we may not know exactly when and how much the USSR has produced in chemical weapons, we have the bits and pieces of evidence (typical of intelligence data about other weapon systems) which add up to a substantial offensive chemical warfare capability. There is no lack of evidence of the Soviet preparations, training, and doctrine which leads to the unavoidable conclusion that the Soviets have an offensive chemical capability which is disproportionately in their favor when compared to the US known capability. Indeed, hard data is available indicating increases in total Soviet chemical warfare capability during the 1970's while the US publicly stopped maintaining a CW capability, ratified the 1925 Geneva protocol, and entered into negotiations with the Soviets on a verifiable ban on chemical weapons. As Dr. Meselson writes, prudence dictates that we assume the existence of a substantial threat. Moreover, one does not have to assume the worse case indicated by the intelligence data to require a policy of deterrence while seeking a complete and verifiable ban on chemical weapons.

Para 1.2. War in a Chemical Environment and Anti-Chemical Protection.—The DSB report made their recommendations based on the Terms of Reference provided by DoD. They were not to consider all aspects of the DoD Program but to assess where and how the U.S. should go toward better preparing for the "substantial Soviet chemical threat." The DSB received substantially more information than appears in the report. The evaluation of options for utilizing defense resources is left to the decision makers within DOD.

The argument over pinhead vs. non-pinhead sized drops appears to be spurious. VX-filled munitions are designed to function such that a liquid aerosol is produced upon dissemination, producing a toxic "rain" effect. In general, droplet sizes of far greater than the minimum necessary are expected. The significance is that a single "drop" of the VX aerosol can be lethal. It should be further noted that the dosage levels given by Dr. Meselson are lethal doses of VX, not incapacitating doses. Also, the classified times of death (not incapacitation) given are those for a total of 95 percent of an exposed group of soldiers, with death occuring for some within a fraction of the time given. Since a single droplet, particularly on the skin, is lethal and could easily go undetected, the premise that the troops could safely assume less than a full protective posture without experiencing casualties is not valid. As Dr. Meselson points out later in his comments, the effects of nerve agent are cumulative. In his Scientific American article of April 1980, Dr. Meselson states, "VX applied at 300 kilograms per square kilometer would create a deadly skin contact hazard which would persist for days or weeks, depending on the weather."

Considering the scenario as presented by Dr. Meselson, note that the troops affected are protected—wearing masks, hoods, gloves, and with no available bare skin for absorption of the VX which is primarily a percutaneous agent of the persistent type. The use of the self-administered antidote carried by Pact forces is anticipated to degrade the effectiveness of the using forces regardless of exposure to VX. Degradation is a principal effect desired, and both protective clothing and medical treatment cause degradation of operational effectiveness.

VX is the most toxic and persistent chemical known to be employed in weapons. It certainly would fulfill the objective of requiring personnel in an attacked area to be fully protected and to decontaminate exposed equipment and supplies, or to suffer casualties continually (both incapacitation and death) for long periods of time after an attack.

The assessment of chemical warfare in WWI does not consider several key points. Surprise attacks with chemicals were potentially successful, but no exploitation was planned or executed. Skin protection against mustard was primitive (although effective masks were used) and casualties did occur in large numbers (which is why the Germans used as much as possible), but the percutaneous casualties were slow to develop and the Germans also did not have effective skin protection against the mustard, so they could not effectively exploit through it. Finally, and perhaps most significantly, trench warfare tactics degraded front line operations so thoroughly that chemical warfare against well trained and (relatively) equipped forces did not significantly further degrade front line operations. The few long range weapon systems available were not used to deliver chemical weapons against rear area communication and logistics centers, which is now a major threat to combat operations.

Dr. Meselson's comment regarding the capabilities of the protective suit are unfortunately given in reference to a sentence taken out of context. A more complete excerpt from the DSB report is: "In addition to the degradation suffered while working in protective clothing, those units operating outside fixed installations suffer more severe degradation hours after an attack with persistent agents. Existing suits are designed to a six-hour exposure specification, but persistent agents remain effective for longer than individuals can remain encapsulated in protective clothing. Consequently, it is necessary to provide clean areas to change suits, eat, sleep, and perform other bodily functions." While it is true that laboratory tests (not under battlefield conditions) have indicated that the suit can exceed specifications, the point of the DSB comment is that the individual cannot persist in the suit as long as a persistent agent can maintain a threat. Six hours remains the best estimate for combat leaders as to how often the suit and other protective clothing should be changed, with some respite from wearing the suit.

Dr. Meselson apparently also misunderstood the operational degradation factor of 30 to 50 percent given by the DSB. "Unit degradation is attributable to the loss of individual effectiveness as well as the imposition of significant logistical burdens: material and forces are required to support decontamination, medical treatment, and resupply of individual and unit protection material." Operation degradation is caused not only by heat stress, but by the loss of sensory capability, bulkiness, and psychological burden of individual protection. Further, operational degradation is caused by all of the organizational activities which must occur in order to sustain operations throughout the theater, not merely on the front lines.

The estimate of 30–50% degradation is not exaggerated but is considered realistic as an estimate of degradation averaged over many activities required in war.

Para 1.3. US Chemical Weapons, Stockpile, and Requirements.—The discussion by Dr. Meselson on requirements reflects his view as to what is adequate to fight a war, whereas the DSB reflected the views of the JCS and the Armed Services. Moreover, Dr. Meselson does have some inaccuracies in fact in presenting his position. First, NATO forces are in the process of acquiring a 155mm howitzer as the standard small artillery piece, so that all 105 rounds are rapidly becoming obsolete throughout NATO. They already are obsolete for the US and the other best equipped NATO country forces. Secondly, tests on agent drawn from munitions do confirm that nerve agent is deteriorating in the current munitions. Further, efforts were made by adding inhibitors to retard the deterioration expected when the munitions were filled in the 1950's and 1960's. No added moisture is required to cause deterioration in the presence of metal walls and impurities in the agent as loaded. Third, the old 155mm and 8-inch shells are not assumed compatible with the range capability of recently developed artillery tubes nor can they be assumed to be safely fired to the full range of old artillery tubes. This is true both due to initial design and due to the lack of test firing since 1969 to ensure that the projectiles are safe to fire even with old artillery tubes at originally designed ranges. Finally, there is no existing bomb with a persistent agent to attack targets beyond artillery range, a major deficiency in the current stockpile which must be corrected to have a credible deterrent.

Para 1.4. Binary Chemical Weapons.—There seems to be no disagreement in fact with respect to the advantages of binary weapons, i.e., that they are intrinsically safer, easier and less expensive to demilitarize, and less difficult and costly to manufacture. Indeed, these facts are known in technical detail in unclassified sources. Dr. Meselson's conclusion that these advantages are not important is difficult to understand.

The questions raised regarding the effectiveness of the binary artillery projectiles are readily answered, and it is a matter of judgement as to their need for greater space in the DSB report. The sound and odor associated with chemical munitions are characteristic of all such weapons to some degree; but when the doctrine of use envisions massive attacks to achieve casualties, use of conventional rounds in conjunction with chemical rounds to obtain synergistic effects, or a few rounds at a time to cause harrassment and degradation through protective measures, the minor signatures of the chemical rounds are not considered tactically significant. In particular, the toxicity of GB is such that if one can detect the odor of the impurities within the agent due to the age of old unitary munitions or due to impurities generated by the binary mixing process, then other physical symptoms will also be detectable.

Neither the GB nor the VX (in the Bigeye bomb) reactions are significantly susceptible to initial temperature within operational limits. One of the GB reactants freezes at about 30°C, but this is below the practical usage range of that agent. Yields to that point are excellent.

Significant decomposition has never been observed in the G-agent reactions. Such decomposition does occur ofter 3–5 min for a VX reaction; however, the maximum flight time of a projectile even with new extended range capabilities is less than 2 min, and normally less than a minute. There is no VX binary projectile planned for production, and the Bigeye bomb will not initiate the binary reaction until just before release.

The binary artillery rounds require the insertion of a cannister prior to use. However, extensive operational testing shows this is not a significant addition to the normal artillery complexities of adding and setting a fuze and selecting the proper propellant charge. The increase in battlefield safety as well as in life cycle cost savings more than compensates for the small increase in complexity.

The Bigeye bomb is urgently needed to provide the capability to attack targets beyond artillery range with a reasonable chance of delivery system survivability. Survivability can be increased through development of a ground or air delivered missile, but much development is required to provide such a capability for very deep targets.

The effectiveness of VX, the most toxic and most persistant of the chemical agents known to be in a weapon, has already been discussed. There is no military doubt of the effectiveness of VX against the targets for which the Bigeye is designed. However, there may be the need for an intermediate volatility agent for other delivery systems, and research is being conducted on such an agent.

The deposition density quoted by Dr. Messelson is lower than that projected for the Bigeye at this time. In addition, the bombs can be delivered with far greater assurance than the TMU-28 spray tank and it can be delivered beyond artillery range. This is why the Bigeye bomb is so urgently required.

Para 1.5. Civilian Casualties. —There is total agreement that the possibility of civilian casualties is an important reason for deterring chemical warfare. Pending attainment of a complete and verifiable ban on chemical weapons, we must ensure such deterrence through a strategy of having both a defensive and retaliatory capability.

Para 1.6. Future Trends.—There is unfortunately no basis for assuming that the degradation in operational effectiveness caused by defending against a chemical environment can be decreased to the level that an opposing force would not see an advantage in using chemicals if he did not have to suffer the same degradation. War is won or lost by even small advantages or disadvantages.

Para 11. Summary.—Dr. Messelson apparently only disagrees on the technical issues of how best to have a chemical retaliatory capability. The net result, however, of his conclusion that no new production is required will ultimately result in unilateral disarmament. That is a conclusion that the distinguished and knowledgeable members of the Defense Science Board specifically did not accept after careful consideration of far more information over a six-month period than that provided in the report or in these commentaries.

With respect to this important study and Dr. Meselson's comments, I would like to make the following observation.

First, the CW study group, which was chaired by Professor John M. Deutch of MIT, consisted of 25 distinguished members, to include the following: Professor Henry S. Rowen, Stanford University; Ms. Amoretta M. Hoeber, a chemical warfare expert at Systems Planning; Dr. Vincent V. McRae, IBM; Admiral Isaac C. Kidd, Jr., USN (Ret.); Dr. Norman Hackerman, President of Rice University; Amb. Seymour Weiss; Dr. Joshua Lederberg, President of the Rockefeller University; Dr. Ivan L. Bennett, Jr., President of New York University; Dr. Reuven Leopold, Vice President at Pratt and Whitney; Dr. Herbert L. Ley, Jr.; Dr. Raymond L. Murray, Chairman, Department of Medicine, Michigan State University; Dr. Victoria Chanpolay, a White House Fellow; and General George S. Blanchard, USA (Ret.). This group of prominent experts in their field devoted over six months of intensive study and review of the total spectrum of chemical warfare. As part of this review, Dr. Meselson briefed the group on his views, which were considered in developing the report. In all fairness to Dr. Meselson, I should point out that he had only a temporary—two day—Secret clearance to review the report and did not have access to the special sensitive information and intelligence data available to the Board. Further, I should note that the DSB report is reinforced by the fact that of the 16 key recommendations, Dr. Meselson takes issue with only one—to produce binary weapons now. We have also reviewed his technical concerns and they were considered prior to making the decision reflected in our fiscal year 1983 Budget request for funds to initiate production of binary weapons.

CHEMICAL AGENT VX

Senator **Warner**. Would you describe in detail for the record the properties of the chemical agent known as VX which make it a militarily useful weapon?

Answer. VX is a highly lethal nerve agent which is also very persistent. Once placed on a target it will remain there for many days to several weeks depending on weather conditions. The persistency is a result of the agent's slow evaporation rate. VX is primarily a contact poison in that it is readily absorbed by the skin. It is also highly lethal if the vapors or aerosol is inhaled. Due to its low evaporation rate, it poses less of a vapor hazard than the less persistent G-type nerve agent. However, its effects are cumulative, so personnel must wear protective masks if they are to remain in an area contaminated with VX. VX is particularly good for forcing long-term degradation on rear echelon targets. Personnel will have to adopt restrictive protective measures for as long as the hazard persists and supplies and equipment will require time consuming decontamination before they can be safely used by unprotected personnel.

CAPABILITIES TO PRODUCE CHEMICAL AGENTS IN UNITED STATES

Senator WARNER. What capabilities currently exist in this country to produce chemical agents if the U.S. civilian industrial base were mobilized and asked to do so? How long would it take such civilian facilities to be brought on line for toxic agent production? Have any contingency plans been formulated and coordinated with private industry toward this end?

ANSWER. [Deleted] the U.S. civilian industry [deleted] have a current capability to produce modern chemical warfare agents or all of their feedstock and precursor chemicals. The two Government-owned nerve agent production facilities are in a lay-away (not maintained) status. It would take at least [deleted] just to renovate and restore the munition filling facilities, and a much longer time to renovate and restore the agent production plants.

Binary munitions planning, extending from the mid-1970s through the present, indicates that for non-commercially available chemicals, i.e., worst case, [deleted] would be required for industry to facilitize. Since feedstock chemicals for neat lethal agents, as in our current stockpile, are the same as for their binary counterparts, commercial faciltization for the production of actual nerve agents would take at least as long as for binary precursors.

Assuming we are funded by Congress to pursue production of binary munitions, our facilitization and chemical procurement contracts with industry will provide for responsive mobilization requirements.

BINARY 155MM ROUND

Senator WARNER. Would you describe the operational plans for employing the binary 155mm round? How difficult is it to assemble and at what stage in combat operations would such assembling take place? Are there concerns about performing such assembling in dust-free environments to prevent contamination?

ANSWER. A credible chemical weapons deterrent/retaliatory capability is one which would be sufficient to deny an enemy a significant advantage from CW use. This requires that we be capable of attacking troops close-in along the front lines through rear targets such as second echelon units and airfields. A combination of weapons is necessary to meet these requirements.

The 155mm binary artillery projectile would give us the necessary close-in direct fire support. Artillery can strike accurately with little or no warning and can randomly mix its fire with conventional rounds to keep front line troops buttoned up. Because of the smaller agent quantity per round, artillery can be used where larger systems cannot—due to their larger off-target hazards. Also, fire can be concentrated and rates can be easily and quickly adjusted to vary coverage when required.

Full assembly or loading of the OPA canister into the 155mm binary artillery projectile is a simple manual operation which involves removal of the projectile baseplate, removal of the fiberboard spacer, insertion of the OPA canister and re-installation of the baseplate. The entire operation takes less than two man-minutes per projectile under all battlefield conditions, and requires no special training other than being told or shown the operation one time. The procedure has been extensively tested by average field troops from a human engineering standpoint.

As currently planned, the full-up assembly of the munition would take place at the ammunition supply point to the rear of the firing batteries just prior to the munitions being issued. This does not preclude, however, the munitions being assembled by the firing unit. Assembly does not require a dust-free environment. As with all military equipment, binary munitions are developed and designed to withstand normal environmental and handling conditions which might be encountered in a combat area.

SOVIET CHEMICAL WARFARE SPECIALISTS

Senator WARNER. Would you provide for the record as complete a table of organization with respect to chemical warfare personnel and equipment as is available for each of your respective counterpart services in the Soviet Armed Forces. Please provide as much detail as possible as to the respected numbers of such chemical-related troops and paraphernalia.

ANSWER. The basic chemical defense unit in the Soviet ground forces is the chemical defense company which is organic to tank and motorized rifle regiments. A chemical defense company consists of a reconnaissance and dosimetric control platoon, a personnel decontamination platoon, an equipment and weapons decontamination platoon, and a support (supply) detachment. The company has an authorized strength of 35 to 50 personnel.

At division-level there is a chemical defense battalion which comprises a headquarters element, two decontamination companies, and probably a chemical reconnaissance platoon and a service platoon. Authorized personnel strength is approximately 200 men.

A chemical defense battalion is organic to each combined-armed and tank army and is organized into a headquarters and services unit, three chemical defense companies, and a chemical reconnaissance company. The chemical defense battalion at army-level is larger than the one organic to divisions and at full strength consists of several hundred personnel.

The largest chemical defense troop unit is the chemical defense brigade normally subordinate to a Soviet front. A chemical defense brigade has a headquarters and services unit, at least three chemical defense battalions, and a chemical reconnaissance battalion.

[Deleted.]

We estimate that the Soviets have a line strength of about 60,000 peacetime chemical troops, which would be increased to about 138,000 in wartime through activation of reservists. The chemical troops have about 12,000 truck-mounted decontamination apparatuses, [deleted] and several hundred reconnaissance vehicles. Chemical troops on active duty can also be augmented by about 40,000 troops assigned to approximately 60 civil defense regiments and battalions.

CHEMICAL WARFARE PERSONNEL AND EQUIPMENT

Senator WARNER. Would you provide for the record as complete a table of organization with respect to chemical warfare personnel and equipment as is available for each of your respective counterpart services in the Soviet Armed Forces. Please provide as much detail as possible as to the respected numbers of such chemical-related troops and paraphernalia.

ANSWER. All Soviet Air Force (SAF) units from headquarters down to company level have chemical warfare officers. [Deleted.] The CBR section is responsible for detecting CBR agents at airfields, for decontaminating the runway, aircraft, personnel, and equipment as well as training. The airfield technical services, under the administrative command of the Rear Services, provide personnel and material support to the CBR defense section. The office of the regimental Chief of Chemical Services, which comes under the Chief of Chemical Troops, provides the technical and training support to the CBR defense section.

[Deleted] any range qualified Soviet pilot could deliver chemicals since the same bomb series can be used for high explosives or chemicals.

The SAF possesses a variety of modern high and low performance aircraft capable of delivering CBW aerial munitions. CW massive fill bombs are maintained which are designed for persistent as well as non persistent agents.

[Deleted.] However, the Soviets probably have enough chemical warfare agents and munitions to initiate and maintain high-intensity operations. CW munitions are probably stored in Front Army and division conventional ammunition depots.

CHEMICAL WARFARE

Senator WARNER. Would you provide for the record a table of organization with respect to chemical warfare personnel and equipment as is available for each of your respective counterpart services in the Soviet armed forces. Please provide as much detail as possible as to the respected numbers of such chemical-related troops and paraphernalia.

ANSWER. Each of the four Soviet fleets has a chemical service that advises the fleet commander on CBR matters, trains chemical officers and sailors, maintains CBR material and depots, and supervises naval CBR units. Table 1 depicts [deleted].

Each warship, submarine and naval squadron has a chemical warfare officer assigned to it. Table 2 shows [deleted].

As far as equipment and chemical related paraphernalia, I will address Soviet offensive capabilities first. [Deleted] however, there appears to be no reason why chemical projectiles designed for ground weapons could not be fired from naval guns, rockets, and missile launchers with comparable calibers. Table 3 lists [deleted].

In the defensive area, most if not all Soviet surface combatants, from small patrol boats to their largest surface ships, incorporate some type or degree of CBR protection. Ship's CBR collective protection systems include hermetically sealed citadels with filtered air overpressures, water washdown systems and supplementary equipment. In addition to their emphasis on CBR collective protection, the Soviets are providing ships with items of individual protective material and equipment. These include protective masks and clothing, individual decontamination kits, and items of medical protection.

[Tables 1, 2, 3, deleted.]

BINARY A SAFER WEAPON?

Senator **Warner**. The question has been raised in some quarters as to whether or not the binary round is, in fact, a safer weapons system than the unitary weapons system it is designed to replace. Because, unlike the unitary, the binary is only designed to hold toxic chemical agents after having been fired. In the event the separating metal parts should be ruptured before firing and the binary weapon should be filled with toxic chemical agents, how safe would it be for U.S. forces to handle such a weapon relative to the known handling considerations of the unitary munition?

Answer. It would be safer in all respects. The generation of a lethal agent from the binary precursor chemicals does not occur until the munition is fired. Since it requires approximately 3,000g's to rupture the canister disks, the conditions under which both disks might fail prior to firing is viewed as highly improbable. As part of the safety qualification of the munition, we verified that the munition can be dropped from a height of 40 feet onto a steel and concrete pad without experiencing any failures. Even in the most unlikely case that the chemical precursors could be purposely mixed within the munition prior to firing, there would be no peculiar or unique hazard in handling the binary munition over that of the unitary munitions, which have actual agent fill. The M483A1 steel shall body of the 155mm binary projectile is a gas tight chamber which would preclude escape of any liquid or vapor formed by the rupture of either or both canisters.

DEVELOPMENT OF BINARIES

Senator **Warner**. Some have suggested that the binaries were developed in response purely to political concerns rather than military ones. Would you address this contention and will you discuss in detail various ways in which binary weapons by their nature will enhance the effectiveness of military forces charged with handling, storing, transporting, and if necessary, using these weapons?

Answer. Our rationale for binary production is based on clearly defined and limited, although important, military objectives: to deny an initiator of chemical warfare a significant military advantage from chemical use by forcing him to adopt similar restrictive protective measures to those he forces on us, and, thus, deter him from using chemical weapons. Binary weapons provide significant advantages over unitary weapons. Most of these advantages center on their safety in storage, handling, and transportation compared to unitary munitions. Because they contain actual agent, unitary chemical munitions require elaborate safety precautions during all phases of handling. For example, the TMU-28/B VX spray tank weighs approximately 2,000 lbs, but comes in a 4,000 lb shipping container. These safety considerations place a burden on the logistics system and restrict the availability of ammunition at the front. Further, once unitary weapons are in the forward area, they are vulnerable to damage from enemy attacks which could result in contamination of our own positions. From a standpoint of weapons effectiveness, the 155mm GB-2 artillery round is essentially equal to the 155mm unitary GB round (about 3.5 pounds of agent on target). The yield from the unitary round is more pure; however, the binary round contains more fill (8.5 lbs vs 6.5 lbs) and has an improved burster. The Bigeye bomb is not directly comparable with any current weapon system. It will fill a void in our capability. Currently all chemical bombs are filled with nonpersistent GB, while a persistent agent, such as Bigeye's VX-2 fill, is required for prolonged degradation of rear area targets. Our only deep strike persistent agent capability consists of [deleted] Navy Aero 14/B refillable spray tanks and [deleted] Air Force TMU-28/B spray tanks [deleted]. The spray tanks also contaminate the delivery aircraft. The Bigeye allows the use of more survivable delivery tactics and does not contaminate the delivery aircraft. Another major advantage to binary munitions is that they are much easier and less costly to dispose of when no longer required in the inventory. Demilitarization of unitary chemical munitions is an extremely complex and costly operation.

CHEMICAL STOCKPILE NEGLECT

Senator **Warner**. Please respond if you can to the question about the GAO's implication of purposeful neglect of our chemical stockpile.

Answer. The 1977 GAO Report, "Stockpile of Lethal Chemical Munitions and Agents—Better Management Needed," stated the Army was not adequately maintaining the stockpile of the lethal chemical munitions. The GAO report does not state that the chemical stockpile was being purposefully neglected, but implies that it was given too low a priority to be adequately maintained. At that time, DoD acknowledged the need for improved management of chemical munitions and agents and concurred with the GAO assessment that the stockpile was deteriorating. The Army has initiated an extensive program to maintain the aging chemical munition stockpile in the best possible condition and reduce the hazards to the public and environment.

BINARY TRANSPORTATION PROBLEM

Senator **Warner**. Concern has been voiced that the binary, by virtue of the fact that components would be handled separately, poses a larger transportation problem for U.S. logistics forces than does the unitary round. Would you address this comment? How does this compare with the logistical problems faced in transporting unitary munitions?

Answer. There may be a perception that since the binary round is incomplete when being transported, it may require significant additional transportation resources to furnish complete munitions. This perception is, however, in error. Ammunition, as a class of supply, is usually characterized by the fact that transportation is more limited by weight than by space. In the case of the binary 155mm artillery projectile, for example, weight of the projectile is more critical than space. The 155mm binary munition, with one of the two required chemical precursors (cannister) loaded, weighs approximately 23 percent less than its counterpart unitary munition; as a consequence, a larger number of binary munitions can be transported at one time. In the case of air movement, a critical consideration in any deployment planning, we find that transportation requirements for unitary and binary 155mm artillery shells are the same. For air delivered munitions, there is a considerable advantage in favor of the Bigeye bomb when compared to the most nearly comparable unitary system, the TMU-28/B spray tank. Additionally, the binary precursor chemicals greatly reduce hazards to personnel who must handle and transport the munitions. Thus, even with the requirement to transport both munitions and canisters, binaries do not increase logistical problems. In fact, logistical problems associated with binary rounds are fewer, for they can be handled as conventional arms ammunition without the stringent technical, safety, and surety requirements of unitary chemical munitions.

Questions Submitted by Senator Carl Levin

NATO ALLIES CHEMICAL CONCERN

Senator **Levin**. Do our NATO allies civilian leaderships share our apparent concerns about the need to improve our offensive chemical capabilities through the production of binary chemical munitions? Do their military leaders? Give a nation by nation response, please?

Have the senior civilian and military organizations in NATO—the North Atlantic Council, the Defense Planning Committee and the NATO Military Committee—all agreed that NATO's present offensive chemical capabilities are inadequate and that the United States needs to produce binary chemical munitions to address this inadequacy?

Have these senior military and civilian groups in NATO agreed with the U.S. JCS-established requirement for the number of tons required in our chemical weapons stockpile?

Answer. The U.S. decision to produce binary chemical munitions derives from our assessment that we need to modernize our retaliatory capability for the purposes of reestablishing a credible and effective non-nuclear deterrent to Soviet use of chemical weapons and to gain leverage in the area of CW arms control. As you know, within the military organization of NATO, the United States is the only ally possessing an offensive chemical warfare capability. The Alliance has long been agreed on the need to retain a chemical weapons retalitatory capability as a deterrent against Soviet use of such munitions. Accordingly, the United States has kept the allies informed of our plans to modernize our chemical retaliatory capabilities through both technical discussions with some nations and formal diplomatic communications with all NATO countries. As early as March 1981, we informed our allies of the administration's plan to seek funding for CW modernization. In February 1982, all our Embassies in NATO capitals informed their host governments of the administration's intent to seek funding in the fiscal year 1983 Defense budget for the production of binary munitions.

We belive it would have been inappropriate to ask the allies to share responsibility for what is a national U.S. decision and thus we have not done so. The funding we are seeking involves development and production. Actual production is still two years away, and it will be some time after that before our stocks will be sufficient to meet our needs. We have kept our allies informed of our program at each step in the decision-making process. No allied government has expressed opposition to these steps or otherwise commented on the substance of the production decision. Our allies recognize, as we do, that a decision to deploy overseas could provoke controversy. They understand and accept that, at this time, we have no plans to deploy any of these weapons in a any foreign country. They are aware that—should overseas deployment of these binary munitions be deemed necessary or desirable—the United States Government will be in full consultation with the nations involved prior to making any decision. As with nuclear weapons, quantified U.S. requirements for nuclear weapons are not released to our allies, although planning is coordinated to assure compatibility of concepts and doctrine.

CHEMICAL DEFENSE TRAINING

Senator LEVIN. Last year, General Rogers, NATO's surpreme commander, stated: "In the last several years, we have made significant progress in the chemical defensive training of U.S. and Allied forces." However, you continued "The situation is totally different concerning chemical retaliatory operations training. [Deleted.] A major problem in [deleted] is the political concern of some of our Allies. [Deleted.] We are attempting to resolve this issue with NATO." Has this problem been resolved? Are are now making progress in this train?

ANSWER. There remain training deficiencies in the area of chemical retaliatory operations. However, improvements have occurred in several instances. The 1981 Reforger Exercise involved a chemical warfare scenario in which chemical retaliation procedures were exercised in conjunction with Allied Forces. The approved NATO procedures for authorization, release, and termination of chemical retaliatory strikes are being used in training. Efforts continue within NATO to improve the chemical retaliatory training status.

Senator LEVIN. If little progress has been made in training our allies to operate during the use of U.S. retaliatory chemical weapons—binary or otherwise—of what utility is an expanded chemical weapons stockpile of binary munitions?

ANSWER. The U.S. requirement for chemical weapons is based on an assessment of our military need to deter chemical use against our forces worldwide. It is not dependent on the participation of the NATO allies in conducting retaliatory operations, although the effectiveness of such operations would be enhanced by their participation. Further, our allies would be at little risk from U.S. chemical artillery projectiles unless they were employing them in their corps areas. Additionally, approximately half the agent tonnage in the current program will be in the Bigeye bomb to degrade targets well behind enemy lines and thus will pose no threat to friendly forces. Also, the major emphasis for future chemical weapons, if needed, will be on weapons capable of striking targets beyond artillery range.

Chemical warfare deterrence does not require every ally to posses a retaliatory capability; rather, the total retaliatory capability of an alliance must be sufficient for those tactical targets in the theater judged to be most effectively attacked with chemical weapons. However, all allied forces need to be prepared for chemical attack. Out NATO allies recognize this need and have agreed to meet certain standards for chemical defense equipage, organization, and training. Specific measures to attain these standards are included in the NATO Long-Term Defense Plan (LTDP). [Deleted]. The ability of our allies to operate during the use of U.S retaliatory chemical weapoins is at least as good as their ability to operate during any Soviet initiated chemical warfare.

ALLIED AIRLIFT RESOURCES

Senator **Levin**. During a NATO conflict, there will be extreme demands placed on our limited airlift resources to resupply Europe. Priorities will have to be assigned to equipment, personnel and supplies so that reinforcements will be delivered in order of importance.

Please provide a rank listing of what are the priorities for use of our limited aircraft in resupplying Europe.

Answer. Priorities for movement of reinforcement forces to Europe are established by USCINCEUR and reflected in his theater plans. [Deleted.] The sequence of these units indicate their priority and can be divided into the following broad categories in priority order: [Deleted.]

Units within these categories overlap in the interest of transportation, i.e., not all of category one is move prior to the first movement of category two, etc.

Senator. **Levin**. What priority will be assigned to shipping any chemcial munitions stored in the United States?

Answer. [Deleted.]

SHIPMENT OF CHEMICAL MUNITIONS

Senator **Levin**. Will there even be sufficient airlift assets available to ship chemical munitions along with all the other categories of supplies needed in Europe?

Answer. Since the US has renounced the first use of chemical munitions. [Deleted] if chemical weapons have been used against US or allied force and if the theater commander needs to retaliate with chemical weapons, [delted]. Binary chemical weapons could be delivered to the theater of operations in a relatively short time, with initial shipments by air and follow-on deliveries by sea. This is not to say that this delivery would be easy or that other assets would not be delayed. However, militarily significant quantities of weapons could be delivered with a small fraction of our lift capability. For example, 60 C-141/B sorties could deliver 20,000 155mm binary artillery shells and 1,000 Bigeye bombs in Europe. This represents [deleted] of the daily total airlift (C-141 equivalents) available in fiscal year 1988.

BINARY CHEMICAL MUNITIONS

Senator **Levin**. Of what use are binary chemical munitions now as a retaliatory weapon against the Soviets if they are stored in the United States and cannot be shipped expeditiously to Europe because of a shortage of strategic airlift until our C-5N/KC-10 procurement program is finished late in this decade? Doesn't this support a delay in the program?

Answer. No, this does not support a delay in the program. Although, procurement funds are required in the fiscal year 1983 budget for binary weapons, actual filling of munitions will not begin until considerably later due to extended delivery times for component parts. In fact, the availability of major quantities of binary munitions will match well with your projection of the availability of the C-5N/KC-10.

CHEMICAL DEFENSIVE GEAR

Senator **Levin**. Do the European reservists so tasked possess chemical defensive gear and are they trained to use it? Do they exercise in this gear so we can be confident they accomplish their mission while under chemical attack? Please answer the same questions for European civilians assigned to these ports during wartime.

Answer. FRG reservists have chemical defensive equipment, are trained, and exercise with the equipment.

Civilian workers do not posses chemical defensive gear and have not been trained in chemical defense. USAREUR has identified a requirement to purchase this equipment; however, it has not yet been included in a budget request due to affordability considerations. The Army has not purchased all the equipment necessary for Active and Reserve Component forces and cannot begin purchases for European civilians until our forces have been properly equipped.

NUCLEAR RESPONSE TO CHEMICAL ATTACK

Senator **Levin**. On page 2, you state "in view of the overall military balance between the United States and the Soviets, we cannot any longer rely on our nuclear capability to deter chemical warfare." Has it ever been either U.S. or NATO policy to respond to a chemical attack with nuclear weapons—either theater nuclear or strategic nuclear weapons? If so, in which documents is this policy articulated?

Have we ever articulated to the Soviets that we would respond to any chemical attack by them with nuclear weapons?

Answer. The United States has not had a specific stated policy to respond to a chemical attack with nuclear weapons, either theater nuclear or strategic. The NATO strategy is to use whatever level of military force is necessary to defeat aggression. We must, therefore, have a capability to respond to an aggressor's first use of chemical weapons. In previous years when NATO had a clear lead in nuclear forces, their deterrent effect was more certain than it is today when we are faced with Warsaw Pact tactical nuclear superiority in some key areas.

NATO/SOVIET THEATER NUCLEAR WEAPONS IMBALANCE

Senator Levin. By the logic of your statement, and its discussion of the alleged imbalance between NATO and the Soviets in theater nuclear weapons, wouldn't improvement of our theater nuclear capabilities under the program adopted by NATO in 1979 to deploy cruise missiles and Pershing II ballistic missiles remove the need to modernize our chemical offensive capabilities? By your logic, improvement of our theater nuclear deterrent would improve our deterrent to chemical attacks, would it not?

Answer. We do not believe we can or should rely exclusively on our nuclear capabilities to counter Soviet chemical capabilities. It is essential that the U.S. National Command Authorities have other response options besides a nuclear escalatory step. Moreover, the GLCM and Pershing II are designed to strike deep, normally static or non-mobile targets. The U.S. chemical warfare modernization program is designed to provide the proper weapon systems (artillery and aerial bombs) and agent mix to deny a military advantage and thus deter Soviet use.

ENEMY FIRST USE

Senator Levin. On Page 3, you state if the enemy "chooses to initiate chemical warfare, he must know that he, too, will have to operate with the encumbrance of protective equipment. If the Soviets attacked us with chemical weapons, why wouldn't they have to order their troops to don their protective gear first, not only to protect them in handling these weapons before firing, but also to protect them during their movements toward and through contaminated NATO positions?

Answer. Although not as safe as binary munitions, chemical munitions such as those possessed by the Soviets can be handled and fired by unprotected personnel. Artillery projectiles are fired at targets many kilometers away on enemy troops, and bombs and missiles are delivered at long range. If the Soviets employed chemical weapons against our front line troops in support of an attack, they would most likely use a non-persistent agent. In this manner they could achieve casualties among the unwarned, and therefore unprotected troops, while at the same time posing no hazard to their own attacking forces which could come through shortly after the attack. In addition, the Soviets might employ persistent agents on deep targets or front line positions they intend to bypass. The attacking forces would be protected by the positive pressure systems of their combat vehicles and thus could move through the positions attacked with non-persistent agent unencumbered by individual protective gear or they could wait for the agent to dissipate. The initiator of chemical warfare has the major advantage of choosing the time and place for the use of chemicals. He can thereby maximize the impact on his opponent and minimize the impact on his own forces. By relying on defensive measures alone, the United States and NATO would concede that advantage to the Soviets. However, by achieving a credible CW retaliatory capability, we have forced the Soviets to consider the problems they create for themselves by initiating the use of chemicals; that we will have the option of causing casualties and forcing them into protective posture at a time and place of our choosing.

BINARY 155MM MUNITIONS

Senator Levin. Under current programs, actual production of the 155mm binary munition could not begin before May 1984. Army estimates that it would require [deleted] to provide facilities needed to load existing bulk stocks of nerve agent into artillery shells. How much would it cost to establish and maintain a program to upload the existing [deleted] into unitary 155mm shells? What is the total cost of the 155mm binary program? How many shells could be uploaded with the [deleted] compared with the [deleted] binary shells you intend to produce?

Answer. The production base for manufacturing bulk agents and filling munitions consists of three installations: Newport Army Ammunition Plant (NAAP) containing the VX bulk production and filling facilities; Rocky Mountain Arsenal (RMA) containing the GB bulk production and filling facilities; and Phosphate Development Works (PDW) containing the intermediate dichloro (DC) facility. (DC is the precursor in the manufacture of bulk GB agent.) None of the plants have been in active use since 1968. The equipment contained in the facilities is old and requires extensive rehabilitation and replacement of components to return to their production capabilities and meet EPA, OSHA, and surety standards. DARCOM completed a study which determined the estimated costs and time required to rehabilitate, layaway, maintain (all under peacetime conditions) and then reactivate during mobilization. These costs are shown below:

[Dollars in millions; time in months]

Site	Rehabilitation		Layaways		Annual maintain cost	Reactivation	
	Cost	Time	Cost	Time		Cost	Time
Rocky Mountain Arsenal	25.25	[Deleted]	0.31	[Deleted]	0.22	5.79	[Deleted]
Phosphate Development Works	35.72	[Deleted]	2.88	[Deleted]	0.33	10.26	[Deleted]
Newport Army Ammunition Plant	61.7	[Deleted]	2.86	[Deleted]	0.33	1.21	[Deleted]

The technical data packages will require updating at a cost of approximately $1.3 million. Additionally, the metal parts for the current family of chemical munitions have not been produced in over a decade.

The currently projected total cost of the 155mm GB-2 binary artillery projectile program is approximately $373 million. This includes $23 million approved by the Congress in fiscal year 1981 for constructing and equipping the 155mm binary facility at Pine Bluff Arsenal, Arkansas, and $350 million through fiscal year 1987 for production of the [deleted] rounds.

Approximately [deleted] 155mm artillery projectiles could filled from the [deleted] of unitary agent.

Senator LEVIN. Has DOD or the Army done a cost-effectiveness analysis comparing a 155mm binary program with that of uploading existing nerve agent into 155mm unitary shells? If not, why not? If so, please provide this analysis to the committee.

ANSWER. As previously demonstrated, the primary reasons for electing the binary concept over unitary munitions to modernize the deterrent stockpile were the improved safety and environmental features, reduced security requirements and the ability to store binaries in areas now denied to unitary munitions. A formal cost-effectiveness analysis comparing the 155mm binary program to uploading existing bulk nerve agent in unitary projectiles was not completed. However, the elimination or reduction of the stringent surety, safety and environmental requirements necessary for munitions filled with the actual lethal chemical agents, would reduce total life-cycle costs in favor of binaries. In addition, we did informally examine the time and costs required to update the unitary projectile technical data package, reestablish projectile production and agent fill lines, procure the metal parts and load-assemble-pack the projectiles. This option was determined to be more costly and would require more time than modernization with binaries. Further, the unitary projectile does not have ballistic characteristics which are similar to the new family of 155mm projectiles. Thus, they would not provide the required compatibility with our modern delivery system. Additionally, the unitary munitions are extremely expensive to dispose of at the end of their life span or if an arms control agreement is attained. In summary, the modern technology and total life cycle advantage of the binary concept over the unitary concept, make binaries the preferred method of modernizing our chemical stockpile.

BIGEYE BINARY BOMB

Senator LEVIN. Under the current program, construction of the Bigeye binary bomb is scheduled to begin in fiscal year 1985. By how much can this program be accelerated, and at what cost? Please provide an annual fiscal year 1983-87 breakdown.

ANSWER. We view the lack of a viable deep attack persistent agent capability as perhaps the major stockpile deficiency. Consequently, due to direction by the Secretary of Defense, the Bigeye program has been accelerated to the maximum extent considered economically and technically feasible. Key constraints are construction of the assembly plant and the manufacture of component parts.

NERVE AGENT MUNITIONS

Senator Levin. By how much, and at what cost (provide annual breakdown) can the program to repair our ground forces and air deliverable nerve agent munitions be accelerated between fiscal year 1983 and fiscal year 1987?

Answer. We have developed an accelerated maintenance and upgrade program for all repairable chemical munitions. It will be completed by mid fiscal year 1986. Construction of environmentally safe maintenance facilities for the different type munitions is one of the key time factors. In addition, we have considered accelerating the program by increasing the work week to six days and working 10-hour days. However, extending work schedules is not desirable because of safety risks and environmental considerations. The total cost for our current accelerated program are:

	Millions
Fiscal year 1982	6.77
Fiscal year 1983	7.29
Fiscal year 1984	6.49
Fiscal year 1985	2.23

Additionally, completing maintenance of the existing stockpile will not alleviate our most critical stockpile deficiencies. First, there will still not be any capability to attack deep targets with persistent agent. And, there will be quantitative deficiencies, because most of the stockpile is unusable even with maintenance. This is because it is either stored in bulk (so there are no delivery means) or compatible delivery systems are being phased out of service (105mm howitzer, rockets, mines).

Senator Levin. Provide for the record a detailed breakdown of our chemical munitions/agent inventory by specific munition type (shell, bomb, land mine, etc.), converting agent tons into numbers of munitions. Please do so along a time line demonstrating the retirement of those munitions between now and fiscal year 1990 which produce your stockpile projection of approximately [deleted] agent tons. How many munitions is [deleted] agent tons?

Answer. The total chemical retaliatory munitions stockpile which is either ready to issue (about [deleted] agent tons) or repairable (about [deleted] agent tons) is shown below, with projected 1990 stockpile if maintenance is performance but no other weapons are produced. These are updated figures reflecting the results of ongoing maintenance and inspection efforts.

	1982	1990
[Deleted].		

a. 4.2" Mortar, 105mm Howitzer, and spray tanks are being phased out of force structure.

b. Land mines and 155mm mustard are not practical nor versatile weapons.

c. Although no agent decrement is shown, these munitions and agents are deteriorating. Average percent purity of agent samples taken from 1977 to 1980 are shown. Metal deterioration impact cannot be fully assessed without firing/flying tests which are currently prohibited.

In addition to the above, there are unrepairable/obsolete munitions containing about [deleted] tons of agent, and about [deleted] tons of agent in bulk containers.

MUNITION SUPPLY

Senator Levin. How many days of supply is represented by the number of munitions embodied in this [deleted] agent tons, and under what expenditure rates in combat?

Answer. If one assumes that the maximum projected munitions containing about [deleted] tons of agent are serviceable in 1990, there would be no capability to retaliate with persistent agent targets beyond artillery range; there would still be very little Navy retaliatory capability; and the logistical problems which cause tactical difficulties would remain. The total Air Force and Navy non-persistent agent bomb capability would be [deleted] to the European theater. The total U.S. 155mm artillery non-persistent agent capability would be [deleted] to the European theater. [Deleted.]

Senator LEVIN. How do these expenditure rates compare with those for the same types of munitions in a conventional battle?

Answer. Conventional requirements will always be higher, because they are based on total use of a delivery capability, while chemical weapons will be allotted only a portion of a delivery capability. For example, in 1987, without binary production and assuming they remain serviceable, the Air Force would have [deleted] available worldwide versus a requirement for approximately [deleted] rounds of air-to-ground conventional munitions for a [deleted] war in Europe alone. The chemical bombs are about [deleted] of the comparable conventional requirement and must meet worldwide needs. If the fiscal year 1987, Europe requirement of [deleted] Bigeye were available, chemical bombs would represent about [deleted] of the total. Another example is Army's artillery ammunition. By 1990, assuming no binary production and no further munition degradation, the Army will have less than [deleted] nonpersistent chemical artillery shells available to support worldwide requirements versus a 1987 [deleted] worldwide requirement for about [deleted] comparable conventional artillery rounds to support only U.S. requirements. This represents about [deleted] of the conventional requirement.

CHEMICAL DEFENSIVE EQUIPMENT

Senator LEVIN. Can your fiscal year 1983-87 program to procure and issue chemical defensive equipment for our active and reserve forces be accelerated, especially in the war reserves category? By how much and at what cost, by year and for which types of equipment?

Answer. No. The fiscal year 1983-87 procurement program for major chemical defensive equipment items (e.g., alarms, decontamination detection) optimized those items available for procurement and the integration of new development items which will be entering initial production during the FYDP years. The objective of the major equipment procurement program is to procure initial issue [deleted]. The level of funding for the war reserve program (Army Stock Fund) to provide stock fund chemical defensive equipment secondary items (e.g., chemical protective clothing) is compatible with the supply and production level of industry. Fill of war reserve quantities for [deleted] supply is programmed to be completed in [deleted]. The Reserve Guard forces plan to complete readiness issues of chemical protective clothing [deleted].

SUSTAINING DEFENSIVE OPERATIONS

Senator LEVIN. Even if we provide our active and reserve forces with the capabilities to conduct a [deleted] chemical war, in both defensive and offensive terms, what is our best estimate of how many days our allies would be able to sustain even defensive operations by the end of the fiscal year 1987 funded delivery period?

ANSWER. NATO standards state various categories on which NBC equipment should be provided to ensure the adequacy of the NBC defense capability of individuals and units.

Category I: *Individual Equipment.*—Minimum individual equipment required for personal survival. A unit so equipped has a limited operational capability in an NBC environment.

Category II: *Unit Equipment.*—Minimum equipment required to give a unit operational capability in an NBC environment.

Provision of individual and unit NBC defense equipment is a national responsibility. Nations don't use numbers of days in their plans, but use numbers of items of equipment.

To survive, each person must be provided with individual NBC protective equipment and be proficient in its use.

Small units should be provided with NBC defense equipment so that they can continue to operate in an NBC environment.

For sustained operations, an NBC defense organization should be established, equipped and manned by trained personnel.

Best estimate: There are no forces in NATO that are completely trained, organized and equipped to fight on a CW battlefield. [Deleted.] Several nations have research, development, testing and evaluation programs designed to produce CW defensive equipment for their forces. Other nations tend to procure best state-of-the-art items which were developed by their allies. Most nations have not yet fully implemented their NBC defense programs. Although all nations have continued to develop their equipment procurement plans, [deleted] in the Northern Region will fulfill this requirement by that date. [Deleted.] The overall estimate is that for NATO forces in general, it will [deleted] when sustained operations in a chemical environment could be conducted.

Senator LEVIN. If the JCS stockpile is based on a [deleted] capability, why are we procuring equipment (NBC) for our active and reserve forces for [deleted].

ANSWER. The JCS stockpile is based on a [deleted] defensive (NBC) equipment must provide for sustainability over the entire period. It is not tied to our retaliatory offensive stockpile requirement. The objective of the fiscal year 1983-87 procurement program (OPA) for major chemical defensive equipment is to procure [deleted]. War reserve stockage of consumable stock fund chemical defensive equipment (CDE) is based on [deleted] sustainability/supply. The stock fund CDE program provides O&M funds to procure readiness sets of chemical protective clothing [deleted].

CHEMICAL DEFENSIVE EQUIPMENT

Senator LEVIN. To what extent are we procuring chemical defensive equipment to provide to our allies after their stocks are depleted?

ANSWER. We are not procuring chemical protective equipment for our allies.

Senator LEVIN. In areas of combined combat operations with our allies, what agreements do we have with them that once their chemical defensive equipment is exhausted, they will permit us to employ chemical offensive weapons?

What agreements do we have with our allies that they will permit the employment of our chemical munitions against Warsaw Pact troops in areas where it is likely substantial civilian casualties also will be caused, even if U.S./NATO troops have adequate defensive equipment?

ANSWER. NATO policy is [deleted].

EXPLOITABLE SOVIET VULNERABILITIES

Senator LEVIN. Your statement speaks of "exploitable Soviet vulnerabilities" in a chemical war. What are these?

ANSWER. Although the Soviets have large quantities of protective equipment, their units currently are [deleted].

The current chemical protective equipment provided to Soviet forces does not appear to be well suited for prolonged combat in a contaminated environment. For example, their suits are made of rubber, which imposes extremely severe thermal burdens. This capability would not be required, however, if the Soviets perceive chemical use to be primarily at their choice, along the front lines and in their enemy's (our) rear areas. [Deleted.] In view of these vulnerabilities, we believe that a relatively modest (but effective and versatile) retaliatory capability would lead the Soviets to conclude that the initiation of chemical warfare is not worth the risks. Thus, deterrence which is our objective.

We should not, however, minimize the Soviet and Warsaw Pact defensive capability. It is well suited to their doctrine and to counter the current minimum threat we pose to them. However, if they were faced with a credible threat of retaliation, major adjustments in their protective capability would be required if they are to sustain combat at reasonable efficiency. [Deleted.] In any case, improvements in defenses would not restore the significant advantage they would gain from CW use against forces that cannot retaliate. Consequently, it is more likely that they would be motivated to avoid chemical use and rely on their formidable conventional capabilities if we had a credible retaliatory chemical stockpile.

TARGET DAMAGE CRITERIA

Senator LEVIN. What, specifically, are the two target damage criteria (casualty production; performance degradation) upon which are based the JCS stockpile requirement?

ANSWER. The two target damage criteria used by the CINCs in preparing inputs to the JCS chemical stockpile requirement were: (1) [deleted] and (2) [deleted]. Both criteria will affect the target by a combination of direct chemical effects and indirectly from adoption of an operationally degrading protective posture in the target area.

Senator LEVIN. How many targets in each theater (Europe, Pacific, RDF) did the CINC's develop? Why wouldn't many of these targets already have been destroyed, degraded by conventional munitions?

ANSWER. The CINC inputs to the JCS munitions requirement were derived using a combination of the following two targeting methods. [Deleted.] For example, this technique could be used for determining munition requirements where the primary objective is to force enemy personnel to maintain a protective posture, thereby degrading their mission effectiveness.

Some of the targets examined in this type of analysis may be destroyed by conventional munitions. On the other hand, some targets considered aa candidates for conventional munitions only, may later present themselves in such a manner as to be more suitable for attack with chemicals. [Deleted.] Conventional weapons are capable of opening up gaps in the protective posture by damaging protective clothing and breaking open protective shelters. Chemical weapons will complicate and delay all recovery tasks including casualty care, will create casualties and increase lethality whenever the protective posture is breached, and will severely degrade the effectiveness of troops in performing their missions.

FEWER BINARY MUNITION PROBLEMS

Senator **Levin**. You claim that binary munitions pose fewer logistical problems than do current unitary chemical munitions. Describe the logistics requirements for present munitions in terms of numbers of troops/trucks/aircraft/ships, etc., needed to maintain, store and distribute them to the front compared with those for the binary munitions? Wouldn't the requirement to store, ship and distribute—separately—the two components of the binary munitions increase, rather than decrease, the logistics requirements?

Answer. Please refer to our answer to Senator Warner's earlier questions which compare the transportation requirements for binary and unitary weapons.

Senator **Levin**. How much usable nerve agent could be recovered from demilitarization of existing but obsolete chemical munitions, if the United States was to upload such agent into unitary artillery shells in the future?

Answer. Assuming that the required facilities were available, the amount of usable [deleted] nerve agent that could be recovered from the demilitarization of existing but obsolete chemical munitions is:

a. [Deleted] of agent GB.

b. [Deleted] of agent VX.

The number of artillery munitions which could be filled with the recovered agent is:

Agent	155mm	8 inch
GB	[Deleted]	[Deleted]
VX	[Deleted]	[Deleted]

If the recovery of agent GB could be accomplished and purified to Military Specification, the amount of agent available for use would be reduced to [deleted]. This quantity would fill [deleted] 155mm and [deleted] 8-inch rounds. There is no process currently available, however, to repurify agent VX.

It would cost approximately $402 million to fill the artillery munitions with the [deleted] pure agents. An additional $77 million ($479 million total) would be required if the GB agent is purified to equate to the binary GB agent. To compare, the cost to produce [deleted] 155mm GB-2 binary munitions over a five year period (fiscal year 1983-87) would be approximately $350 million.

Additionally, production of more unitary munitions would add to the formidable demilitarization problem, since the new munitions would eventually have to be disposed of when they reached the end of their useful lives or in the event of a disarmament agreement. Binary munitions, on the other hand, would be disposed of at low costs.

ESTIMATED DEMILITARIZED COST

Senator **Levin**. Could the $3 billion in projected demilitarization costs you estimate in your statement be reduced if this nerve agent was "recycled" into newer unitary munitions? Provided detailed cost estimates showing why it could or could not be reduced.

Answer. The estimated demilitarization cost could be reduced by approximately $400 million if nerve agent was recovered and transferred to ton containers and retained at current storage locations. However, this would only be a deferral of the requirement, since the agent would require ultimate demilitarization.

STORAGE NEGOTIATIONS WITH BRITISH

Senator **Levin**. What is the status of our negotiations with the British about the possibilities for forward deployment/storage of binary munitions? What have we requested and how have the British responded?

Answer. We have kept our allies fully informed concerning modernization of our chemical weapons capabilities, including the decision to produce binary munitions. That decision concerned only production; no decision on overseas deployment has been made. If such deployment ever appeared necessary and desirable, we would consult fully with the affected governments before making any decisions. We have not entered into any negotiations with the British on the subject of forward deployment/storage of binary munitions.

TESTING STATUS WITH FRANCE

Senator **Levin**. What is the status of any discussions with the Government of France about the testing of our binary munitions on French soil? What have we requested, and what has been the French response?

Answer. We have not made any requests to France concerning the testing of U.S. binary munitions on their soil. We did recently participate, along with several other nations, in a live agent test of chemical detectors and alarms hosted by France, and will participate in similar activities in the future, should the opportunity arise.

BINARY MUNITION TESTING

Senator **Levin**. Where does the United States intend to test fire our binary munitions using actual nerve agents as opposed to simulants? Why is it necessary to test using the actual nerve agents?

Answer. We have no plans to test fire binary munitions using actual nerve agents. We have high confidence in the testing programs using simulants. The capability to produce nerve agent in the weapons has been validated under enclosed conditions.

BIGEYE BINARY BOMBS

Senator **Levin**. Once procured, will the Navy deploy Bigeye binary chemical bombs aboard its aircraft carriers?

Answer. The decision to modernize our chemical weapons concerns development and production only. No recommendations or decisions concerning deploying Bigeye bombs aboard carriers have been made.

NAVY'S CHEMICAL DEFENSE PROGRAM

Senator **Levin**. What additional funding would be required in fiscal years 1983-87 to accelerate the Navy's chemical defense program? Please provide an annual breakdown and identify for what the funding would be used each year, especially in R&D and procurement.

Answer. The Navy's fiscal years 1983-87 chemical warfare program represents the best corporate judgment of the Navy, the DOD, and the Administration considering fiscal constraints, needs, and the ability to productively invest the funds. The entire issue is being readdressed in the fiscal years 1984-88 POM development process in light of revised DOD guidance, and some changes are anticipated.

SOVIET CAPABILITIES

Senator **Levin**. What are Soviet capabilities—offensive and defensive—to conduct chemical warfare at sea? Do the Soviets have collective and individual protection systems aboard ship? Do the Soviets deploy chemical munitions aboard ship? What is Soviet doctrine especially addressed to naval chemical warfare?

Answer. As to offensive, we know that the Soviets have developed a variety of CW agents and what certain naval weapon systems are capable of delivering CW munitions. In the defensive area, most if not all Soviet surface combatants, from small patrol boats to their largest surface ships, incorporate some type or degree of CBR collective protection. In addition to their emphasis on CBR collective protection, the Soviets are providing ships with items of individual protective material and equipment. These include protective masks and clothing, individual decontamination kits, and items of medical protection. [Deleted.]

Senator **Levin**. What are the capabilities—offensive and defensive—of the Soviets' Warsaw Pact and other allies—Cuba and Vietnam—to conduct chemical warfare at sea?

Answer. [Deleted.]

Protective measures are probably similar to those of the Soviet Union which are considered superior to that of any other nation. These include individual protective equipment, agent detectors and therapeutic kits. Most ships are probably equipped with special decontamination apparatus and/or complete water washdown systems. Extensive training in the use of this equipment is integral to exercise for the naval forces of all of the U.S.S.R.'s allies.

Questions Submitted by Senator Dale Bumpers

NEWLY DISCOVERED ENZYME

Senator **Bumpers**. There have been recent press reports of a newly-discovered enzyme that may detoxify nerve agents. Has DOD evaluated the effectiveness of this enzyme? If this enzyme proves effective, will its production be included in the proposed chemical warfare program. Describe the emphasis that will be given to developing and fielding the ability to counter the use of chemical agents by our adversaries?

Answer. The enzyme, extracted from a species of squid, appears to be effective in detoxifying one specific type of nerve agent. The investigative work done so far, that reported in the press, has been funded by the Army under a basic research program. The results show potential for a number of chemical purposes, including treatment, decontamination, and the disposal of obsolete or unserviceable nerve agent stocks. However, it is premature to be planning production of the enzyme. As stated above this is a basic research program. The enzyme has been successfully extracted from the squid by a complex procedure and in very small quantities. Production of usable quantities would probably require the synthesis of the enzyme, a process which has not been developed, would take considerable time and money to develop, and is not guaranteed to be successful. Additionally, so far the enzyme appears to be specific to a single agent. It is highly desirable that a more broad spectrum item be developed. As stated previously, the concept shows good potential, and we intend to pursue it; however, it is neither a short-term fix nor a panacea.

Regarding the emphasis within our program on providing protection from enemy chemical use, more than 70 percent of our fiscal year 1983 budget request is for chemical protection. Also, protective measures will account for approximately two-thirds of the projected fiscal year 1983-87 program costs. Unfortunately, protective measures alone are insufficient to deny an enemy a significant advantage from chemical use. This is due to the debilitating effect of chemical protective equipment and procedures on the victims of chemical attack. We also require the ability to force an initiator of chemical warfare to adopt the same restrictive protective measures he imposes on us; thereby, denying him an advantage from chemical use and deterring him from doing so.

SOVIET UNION SEEKS NEGOTIATIONS

Senator **Bumpers**. The Soviet Union has reportedly called for renewed negotiations to limit or ban chemical weapons. Has the Administration responded to that proposal? What would the DOD position be on a possible requirement that a good faith effort be made to resume or conclude negotiations before proceeding with the production of binary weapons?

Answer. The bilateral U.S.-Soviet negotiations on a CW prohibition have been stalemated principally because of fundamental disagreement on the issue of verification. Although the United States made a "good faith effort" over three years of intensive negotiation, the Soviets would not seriously discuss effective verification and compliance measures. The negotiations were further complicated by our military weakness in this area compared to the Soviets. The Soviets appear to have been interested in negotiations only to the extent that that process encouraged the United States to defer improvement of U.S. CW deterrent and retaliatory capabilities.

As the President has indicated, we remain prepared to enter negotiations toward a comprehensive CW ban at any time we see indications that the Soviets are ready to negotiate in good faith. We see no such indications and have made clear to the Soviets that bilateral negotiations would not be productive at this time. DOD would view any legislative requirement (if that is the meaning of the reference in the question) to delay production of binaries until bilateral negotiations had been resumed as not productive; our previous unilateral restraint has neither reduced the threat of chemical warfare nor produced an effective arms control solution to that threat. Indeed, as noted in the March 1982 Report to Congress, our CW modernization program should improve disarmament prospects by providing an increased incentive for the Soviets to be forthcoming on the critical issue of verification.

CHEMICAL DEMILITARIZATION PROGRAM

Senator **Bumpers**. Please outline the proposed chemical weapons demilitarization program. What would the DOD position be on a proposal that would require that for a given amount of agents or number of binary weapons produced, an equivalent amount of exiting agents or existing weapons would be demilitarized, over a specified period of time?

Answer. The ultimate requirement of the demilitarization program is to safely dispose of the entire stockpile of unitary munitions and agent. The first priority is being given to those munitions which are currently unserviceable. In fiscal year 1982, the Army initiated a research and development program to attempt to develop more cost effective demilitarization methods. During the fiscal year 1983–87 period, demilitarization will account for approximately one-sixth of the total chemical program costs. The bulk of the demilitarization cost will occur after fiscal year 1987 as the binary munitions stockpile increases. DOD would be opposed to any law imposing arbitrary quotas for demilitarizing existing chemical stocks for two reasons. First, proper phasing is essential to assure that as credible as possible chemical stockpile is maintained at all times during the transition from unitary to binary systems. Second, it will take time for the research and development program started in fiscal year 1982 to bear fruit. Too much haste could increase costs due to not taking advantage of the most cost effective methods available.

Senator **Warner**. This subcommittee is now adjourned.

Thank you, gentlemen.

[Whereupon, at 4:10 p.m., the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

TUESDAY, MARCH 16, 1982

U.S. Senate,
Subcommittee on Strategic and
Theater Nuclear Forces,
Committee on Armed Services,
Washington, D.C.

SPACE SYSTEMS

The subcommittee met, in open session, at 2:18 p.m., in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Quayle, and Jackson.

Staff present: Frank J. Gaffney, Patrick L. Renehan, professional staff members; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Jim Dykstra, assistant to Senator Cohen.

Senator **Warner**. I apologize for my tardiness, but we were having a caucus on the strategy by which a certain group of us are going to work here on the Senate side to gain the required support for the defense program for fiscal year 1983. So, I have been actively but indirectly working on your behalf for the last 1½ hours.

This afternoon we reconvene in open session as a continuation of our closed session of March 10. The subject of these hearings is to prepare, to the degree it is possible to do so, a record which informs the American people of the seriousness posed by the Soviet advances in the utilization of space for military purposes.

We are pleased to have with us once again representatives of the Office of the Secretary of Defense, the Department of the Air Force, and the Defense Advanced Research Projects Agency.

These gentlemen have important responsibilities for command, control and communications, space defense and related programs which are coming to have a larger and more pivotal role in U.S. military operations.

Without anything further to say by the Chair, we will now proceed. Dr. Cooper, we are delighted to have you here again.

STATEMENT OF DR. ROBERT COOPER, ASSISTANT SECRETARY OF DEFENSE (RESEARCH AND ENGINEERING/DARPA, DESIGNATE)

Dr. **Cooper**. Thank you very much, Senator Warner, we are delighted to be here this afternoon.

This afternoon I have with me several of my colleagues who have major interests in space in the Defense Department. On my right is Brig. Gen. Bernard Randolph, who is Chief R. & D. Officer in the Air Force dealing with space programs. On my far left is Dr. Charles Cook, who is with the Office of the Secretary of the Air Force, he is an expert in space. On my immediate left is Maj. Gen. Donald Lamberson who is head of the Directed Energy Office, newly created in the Office of the Secretary of Defense, and he will have some things to say about space-based laser weaponry.

With your permission, I would like to submit a brief statement for the record, summarizing some of the key points about the Defense space programs, and I would just like to highlight, before I pass the charge to my colleagues here some of the key elements of our space program for fiscal year 1983.

SOVIET SPACE PROGRAM

First of all, the Soviets have a substantial space program of their own to meet their needs. The key mission areas they cover range all the way from photographic, electronic intelligence, and tactical targeting systems. They also have a very strong manned space program. We have reason to believe that their manned space program has a number of military purposes as well.

While recognizing that the Soviets are strong in space, we believe that we have a very strong program of our own. Our program is not aimed so much at denying the Soviets access to space as it is to meeting our own needs. Although, we are actively working on an antisatellite system for the future.

Senator WARNER. Excuse me, as they are likewise working on one. I think there is a certain parallel development in this area, would you not say?

Dr. COOPER. That is true. There are also developments where they are attempting to meet the needs that they have to complement their surface forces. We also are concentrating on areas where we need to support and supplement our forces on the surface with space assets.

Senator WARNER. Would you care to try to describe the asymmetry or assymetry which exists between the two nations programs in this area?

Dr. COOPER. Well, we believe that the Soviets have a very strong space program. They are obviously spending a great deal on their space assets. They are launching a substantial number of spacecraft each year. They conducted 100 launches last year of which, I believe, 97 were successful. That compares to 18 successful launches for the entire U.S. space program, both military and civil.

Senator WARNER. Well, of that 97, do we have a breakout, or could you make public approximately what was military versus civilan purposes for those launches?

Dr. COOPER. We have a great deal of difficulty, sir, determining precisely what the uses of many of the Soviet space systems are, whether they are military or whether they are peaceful and experimental satellites.

But I think we can make a general breakdown of our estimate of what the purposes of those launches were and submit it for the record.

[The information follows:]

SOVIET SATELLITE LAUNCHES

The 97 successful launches in 1981 resulted in 124 payloads orbited. We assess their missions as follows:

[Deleted.]

Senator **WARNER**. There should be no doubt in the mind of the American public that a considerable portion of the Soviet space program is oriented toward the military missions.

Dr. **COOPER**. That is correct. We believe the preponderance of these 97 successful launches were for military purposes.

Senator **WARNER**. That is the key word, "preponderance."

DOD SPACE PROGRAM COSTS

Dr. **COOPER**. Now, our request for fiscal year 1983 will be $8.5 billion for the DOD space program. This does represent a real growth in our space programs of about 20 percent.

The investment that is represented by that $8.5 billion will be stretched across a number of mission areas, but key among those will be communication and navigation systems. We will be starting a new communication satellite program in the coming year, the forerunner of—essentially the backbone of—our space communication assets of the late 1980's and early 1990's. We are entering into the procurement phase of the substantial part of the NAVSTAR GPS—precision navigation satellite system. But we will also be making substantial investments in ballistic missile surveillance, and other surveillance systems as well.

We also have a vigorous technology program to increase our capability in space in the future. Key among some of the technology efforts that we have ongoing are efforts to increase the capability that we have to build advanced surveillance systems and to create and control new spacecraft that will be more autonomous and more survivable. We have strong programs in launch vehicle activity with NASA related to the Space Shuttle and we are producing the high-energy upper stages that we will be needing to carry our spacecraft into higher orbits.

In addition, we have a strong thrust in a very advanced technology, that is space-based laser weapon technology. General Lamberson will be talking more about that later on.

That summarizes the scope and breadth of our space programs in Defense. I at this time would like to defer to General Lamberson.

[The prepared statement of Dr. Robert Cooper follows:]

PREPARED STATEMENT BY ROBERT S. COOPER, DIRECTOR, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

INTRODUCTION

Mr. Chairman and members of the subcommittee, I am pleased to have this opportunity to appear before you this morning to review the space activities of the Department of Defense. Accompanying me today is my deputy and assistant for directed energy weapons, Maj. Gen. Donald L. Lamberson and the Director of Space Systems and C^3 at the headquarters, Air Force, Brig. Gen. Bernard P. Randolph, both of whom are also prepared to address you. In order to provide perspective for our space programs, permit me to briefly discuss recent Soviet activities in space.

SOVIET SPACE ACTIVITIES

Soviet space activities continued at a high launch rate indicative of an expansion of capabilities in 1981. The Soviets attempted 100 launches—more than the 89 launches each in 1979 and 1980—and placed 124 payloads into orbit, exceeding the previous record of 118 set in 1978. We expect this high rate to continue through the 1980's with the advent of new systems and capabilities. Development continues on a new space booster, in the Saturn V class and large permanently manned space stations and complexes. Soviet military space capabilities include an antisatellite system; ever expanding communication relay satellite systems to support Soviet ground, sea and air forces; and various satellite networks for navigation, and meteorology. A significant feature of the Soviet program and one which has considerable military potential, is their manned program.

Salyut 6 completed four years in orbit on 29 September 1981 and remains in orbit. Two cosmonauts, ferried on an improved Soyuz performed a 75-day mission beginning 12 March 1981. On June 19, 1981 the Soviets docked Cosmos 1267 to Salyut 6. This test was described as a test of rendevous and docking and subsequent dynamics of two large space stations. According to the Soviets, Cosmos 1267-type vehicles will be used in the future as space station modules, each carrying equipment required for a particular mission. The events of 1981 certainly portend the advent of a new modular space station for the Soviets and move them well along the way towards the goal of a large permanently manned space station.

DEPARTMENT OF DEFENSE SPACE ACTIVITIES

Let me turn to our own activities. Space activities of the Department of Defense are continuing to expand maintaining the trend of the past few years. Our military forces are becoming increasingly dependent upon space capabilities, I might note with attendent increases in effectiveness. In fiscal year 1983 we have requested $8.5 billion for the Department of Defense space programs. This represents a real growth of 20 percent relative to the $6.4 billion appropriated in fiscal year 1982.

SPACE TRANSPORTATION SYSTEM

Truly significant space accomplishments of this past year were successful flights of the Space Shuttle *Columbia*. The Space Shuttle provides the key for a sustained presence in space, as a working environment. The capability to deploy, retrieve, service, and repair operational platforms is at hand.

NASA has taken the lead in the development of the Shuttle. We in the DOD have made a strong commitment to exploit the Shuttle and its associated technologies in our future space planning. We have accepted responsibility for the development and operation of the Shuttle launch site at Vandenberg Air Force Base for polar orbiting missions, for the development and production of the inertial upper stage (IUS) for use on both civil and DOD space missions, and the development of a number of Shuttle related operational capabilities which will enable the DOD to fully exploit the Shuttle.

SPACE WEAPONS

The increasing capabilities of military space systems and the operating forces' reliance on them mark military satellites as attractive targets and underscores the importance of free access to space for our national systems. The Soviet Union's deployment of an operational antisatellite system demonstrates their understanding of that situation and provides additional rationale for DOD consideration of the role of space weapons. We must develop the means to deter an enemy from using antisatellite weapons against our military satellites. Furthermore, if deterrence fails, we must be able to protect our satellites using, if necessary, active satellite defense weapons.

SATELLITE COMMUNICATIONS

In the area of military satellite communications systems, we have spent a year and a half on a joint effort with all the services and agencies involved to define a new MILSATCOM architecture. This architecture relates combat and combat support needs to near, mid, and far term MILSATCOM systems in the presence of the ever growing Soviet threat. The heart of the architecture is MILSTAR, a system to provide survivable and enduring, jam-resistant communications to small and mobile terminals of the strategic and tactical forces. A joint program office has been established at the Air Force's space division where system definition efforts are underway. We anticipate the DSCS III satellite program will continue to provide its unique and vital services throughout the 1980's. We are asking for funds to continue the acquisition of three additional FLTSATCOM satellites to ensure we do not have a strategic communications gap until the MILSTAR system is sufficiently operational.

METEOROLOGY

The defense meteorological satellite program (DMSP) supports DOD needs for weather information. Its operational requirements dictate the collection of weather data in centralized centers from at least two satellites continuously in orbit, obtaining coverage from all points on the Earth at least four times each day. Regional weather data is also transmitted in real time to transportable read-out stations at key locations worldwide to support Army, Navy, and Air Force tactical operations.

NAVIGATION

The DOD is continuing the development of the Navstar global positioning system (GPS) to satisfy the military need for information on the location of force elements. Navstar GPS will provide users with precise position information on a 24-hour, global basis under all weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all US military forces. In addition to its primary function of improving US and allied military forces' weapon delivery and target destruction capabilities, GPS has the potential to provide unique positioning and navigation services to civil and commercial interests on a world wide basis. GPS satellites will also play another extremely vital defense role by carrying the integrated operational nuclear detection system (IONDS) payloads. IONDS will provide real-time strike and damage assessment information, thereby enhancing strategic force management.

STRATEGIC DEFENSE SYSTEMS

The defense support program (DSP) is one of the key elements of the U.S. defense posture. The system utilizes satellites at synchronous orbit. In fiscal year 1981 we initiated the acquisition of mobile ground terminals to enhance the survivability of the system. The fiscal year 1983 budget requests funds for the acquisition of two DSP satellites.

SUPPORTING SCIENCE AND TECHNOLOGY

The DOD is investigating a wide range of space technology to maintain our present lead, estimated to be 5 to 10 years, over the Soviets in selected areas. Many of these technology base efforts, such as lasers and communications, are discussed in my statement for the record. The following are some highlights of others which offer considerable promise.

Several programs related to missile surveillance technology are developing sensors and collecting background data for application of infrared (IR) technology to surveillance and warning missions. Development of surveillance technology for infrared mosaic detector arrays, onboard signal processing, cryogenic refrigerators, large optics, and structures continued in 1981. A new generation of detector arrays, physically integrated with preprocessing electronics in a planar configuration, was tested. Advanced microwave technology on miniature, low cost radar transceiver modules using integrated circuit technology is being pursued. Low cost/weight and high efficiency of the modules are key factors in feasibility for use in space-borne radars as well as a variety of other phased array radar and communication applications in airborne and surface systems.

MANAGEMENT OF SPACE PROGRAM

The DOD has undertaken an internal review of its space policy. This was felt to be necessary in order for the DOD to effectively plan the future course for the military use of space. This departmentwide study is chaired by the USD(P) and is intended to produce a comprehensive DOD-space policy to guide the conduct of the space activities of the Department. The DOD space policy will also serve as a frame of reference for the Department to address some of the issues being reviewed in the national space policy review under the auspices of the Office of Science and Technology Policy. The DOD space policy study is in its final stages and we anticipate recommending the policy to the Secretary of Defense before the end of April.

The centralizing management of space activities within the DOD, has been discussed for some time. Our organization for space has been evolving fairly rapidly over the past four years. Within the Office of the Secretary of Defense we have established a space operations committee. The Air Force has established a space operations steering committee; formed a new directorate of space within the Deputy Chief of Staff, plans and operations at headquarters Air Force, and has designated the Deputy Commander for Space Operations at space division in Los Angeles. In Dr. DeLauer's office, he has asked me to act as the principal focus for review of space research and development across all mission areas. We will continue to evaluate organizational alternatives to effectively manage our space activities.

CONCLUDING REMARKS

As we move into the mid-1980's, this administration has drawn attention to the increasing rise in Soviet capabilities. This rise is not limited to the tactical and strategic warfare programs, but also is taking place in the research and development activities on which the space programs of the 1990's will be based. In order to meet the Soviet challenge, we in the executive branch must work with the Congress to ensure the continued superiority of our national technological capabilities.

I would note that continuing technological advancement in space is dependent on the availability of sufficient numbers of qualified scientists and engineers. The Department of Defense is currently looking into issues related to national shortages in specific scientific and engineering specialities in order to determine what impact national shortages, particularly in the engineering field, are having on our ability to recruit, retain and support scientific, engineering and technical personnel.

Proper support for our national science and technology programs not only enables the development of systems we seek but also serves to engender interest and attract and retain the highly skilled personnel so vital to our national preeminence in astronautics.

Parochially speaking, I view this support as critical to our national security.

I, therefore, encourage your full support for our space programs, recognizing our common goals in preserving U.S. technological excellence.

Senator **WARNER**. Let me ask one question before you pass on, sir. In your appearance before the House you indicated that the resources being allocated to space-based laser technology development were appropriate, and that you were disinclined to see additional sums being spent in this area at that time.

Some of the Members of the Senate have taken quite a different viewpoint, that we should be spending considerably more money, and I anticipate this issue to arrive once again this year.

SPACE FUNDING REQUEST

Would you discuss at this time in somewhat greater detail precisely what you think the funding level should be, and why additional money should not be provided.

Dr. **COOPER**. Sir, I believe that we have a strong and vigorous technology program in the space-based laser weapon area. Our request for fiscal year 1983 generally in that technology area will amount to about $150 million; that is up by about 50 percent from what we are spending this year, and will, I think, substantially increase our efforts in mission analysis, in looking at some of the system issues associated with potential space-based laser weapons in the future.

We have in the Defense Advanced Research Projects Agency a very strong technology program which I characterize as moving through a technology confirmation period over this next 5-year period of time.

The foundation of that technology program is based in three major programs. One will demonstrate precision pointing and tracking per space application with a space-borne experiment scheduled for sometime later in this decade.

We have a large laser development program which will result in a ground demonstration of a major multimegawatt class laser. And finally, we have a large optics demonstration program which will demonstrate on the ground new capabilities of optical systems that would be needed for these weapon systems in space.

In addition, we have a substantial amount of funding going into the development of additional laser and beam control technology in support of these three major programs, and laser weaponry in the future.

To cover the more distant future, we have a very vigorous program in short-wave length laser technology which could, if these systems prove feasible, drive them to even greater capability in the 1990's time period.

I have looked at the program very carefully over the past few months both in my capacity as Director of DARPA and by special request from Dr. DeLauer, the Under Secretary of Defense for Research and Engineering.

I have tried to structure these programs in such a way that they are moving about as rapidly as they can. I believe the funding we are requesting in fiscal year 1983 is appropriate for this structure. Just to give you some idea of the scope and magnitude of this effort over the 5-year period of time, if we were to include the launch support, the new activity in the mission area in the Air Force, and the entire program at DARPA, including both the near-term laser technology and the far-term laser technology; we will be spending more than $1 billion on space-based lasers in the fiscal year 1982 through 1987 time period.

I believe, sir, is adequate. It is a very vigorous program. It is moving at a tremendous pace, and I think we are probably limited a good deal by our ability to man such a broad-based program.

Senator WARNER. The ability to man it?

Dr. COOPER. That is right. We have a very high technology program that is moving across a broad front of technology. Just being able to keep that program together is a substantial problem for the Department at this time.

That is one of the reasons why we have brought General Lamberson from his previous assignment at Eglin Air Force Base back to Washington. We have asked him to work with us in the Office of the Secretary of Defense to draw together not only all of the technical work that is associated with the space-based laser weapon program, but all of the ancillary high-energy laser technology which we will be devoting to other weapon system activity and the particle beam technologies which we are also pursuing in this same broad program area.

Don will be joining us very soon. He is trying to get his family moved up here now.

Senator WARNER. I visited the facilities out at Kirtland and went through that program.

ASYMMETRY BETWEEN UNITED STATES/SOVIET SPACE PROGRAMS

What can you tell us about the Soviet activities in this area and the asymmetry between our programs and the Soviet programs?

Dr. **Cooper**. Generally the Soviets, we know from relatively hard evidence, have a very strong high-energy laser program overall. There have been various estimates of how much effort the Soviets are putting into the high-energy laser business over the past 10 years.

I believe it is our best judgment today that they are probably spending several times as much in the overall high-energy laser area as the United States. Estimates in the intelligence community run anywhere from three to five times as much. We have very little knowledge of what fraction of that expenditure, and what fraction of that human effort, is actually being invested in space-based laser weapon technology. The intelligence there, I must say, is fragmentary and very incomplete.

So, it is really only a guess as to where they may stand with respect to us in this particular technology area. We can only speculate from the fragmentary information that we have that they are doing something, but there is very little visible evidence to give us a clue as to how far along they may be in their research and development efforts.

SPACE-BASED LASERS

Senator **Warner**. We at this time ask General Lamberson to comment on this portion of the testimony relating to space-based lasers. It is your professional judgment that sufficient funds are in this budget?

General **Lamberson**. Would you repeat the question, sir?

Senator **Warner**. Is it your professional personal judgment? In other words, I am asking you for your personal opinion if there is sufficient funding in the fiscal year 1983 budget.

General **Lamberson**. It is my professional judgment, having viewed that budget for only a few days, Senator, that it is sufficient. There are issues of technology pacing and those critical technologies which we must have better insight before we commit to the system. I believe it is appropriate.

As Dr. Cooper has described, primarily in the Air Force program there are other issues: The hardness of targets; the survivability of our systems; the concepts under which we would operate those systems—assuming the technology works—for which remain large questions, and which we will be funding in the 1983 time period. I believe that represents a reasonable and aggressive effort to resolve those issues.

Senator **Warner**. Senator Jackson.

Senator **Jackson**. I have no questions.

Senator **Warner**. Go ahead, Dr. Cooper.

Dr. **Cooper**. I would like to pass the discussion now to my colleague here who would like to summarize the Air Force's space programs.

Senator **Warner**. General Randolph.

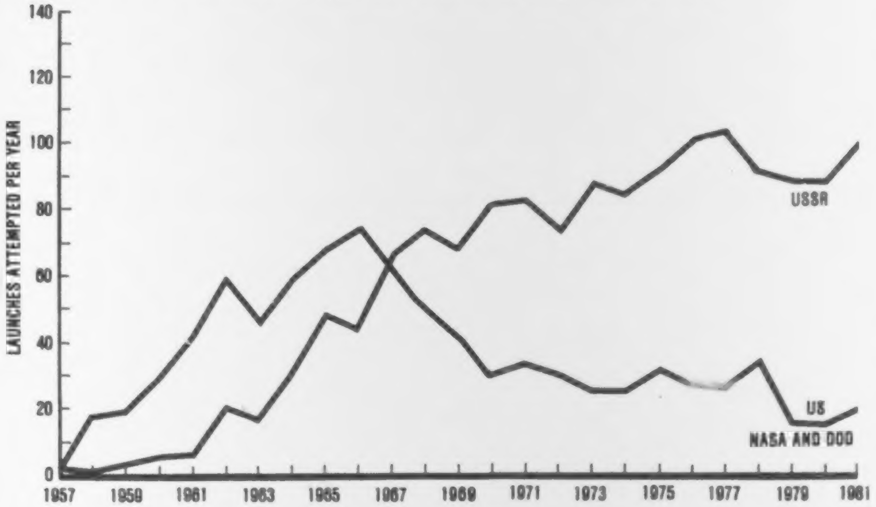
STATEMENT OF BRIG. GEN. BERNARD P. RANDOLPH, DIRECTOR, SPACE SYSTEMS AND COMMAND, CONTROL, COMMUNICATIONS, DEPUTY CHIEF OF STAFF, RESEARCH, DEVELOPMENT AND ACQUISITION, HEADQUARTERS, U.S. AIR FORCE

General RANDOLPH. Mr. Chairman, with your permission I would like to use some viewgraphs.

I would like to continue with the discussion we had the other day when I testified before this committee and discuss some of the things we are doing as in the Air Force space program.

Before I get started, the question of how we stand with regard to the Soviets is addressed in part on this next chart, I have two points to make about the chart.

The chart shows the time across the horizontal scale, and the number of launches the Soviets have attempted per year on the vertical scale.

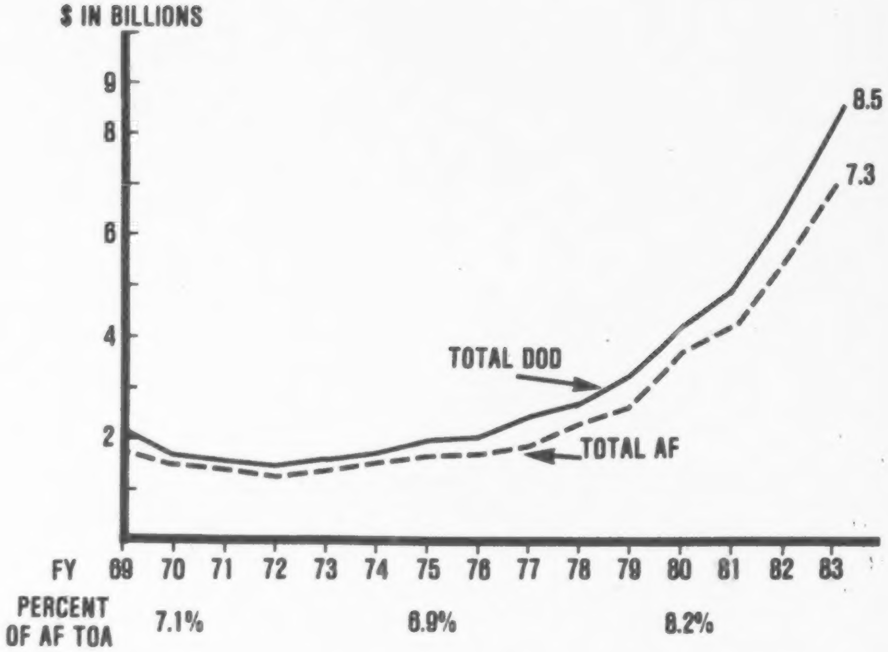


SPACE ACTIVITY: COMPARISON OF US & USSR

As you can see, the Soviet activity in space has increased rather dramatically with the approximately hundred launches Dr. Cooper referred to last year, versus our 19 launches.

There are two messages on the chart: However, first of all, the Soviets are very interested in space and these are some very active programs they have. Second, something that is not so obvious from the chart, that we in the United States also have an active space program that is very aggressive. But we have learned to use space more efficiently.

SPACE BUDGET



Let me illustrate with this next chart by showing you the kinds of increases we have in dollars with time. You see on this chart billions of dollars on the vertical scale, time on the horizontal. You can see the total DOD request for fiscal year 1983. It is $8.5 billion, the Air Force request is $7.3 billion. That is an increase not only in absolute terms but also an increase in percentage of Air Force total obligation authority to approximately 10 percent in this fiscal year. So we do have an active program.

Sir, I would like to talk now very briefly about some of the things we are doing in that program.

Objectives of the Air Force in Space

Enhance space order of battle.
Develop, more survivable and enduring systems at all levels of conflict.
Provide more evolutionary (rather than revolutionary) improvements.
Exploit the STS to its fullest.

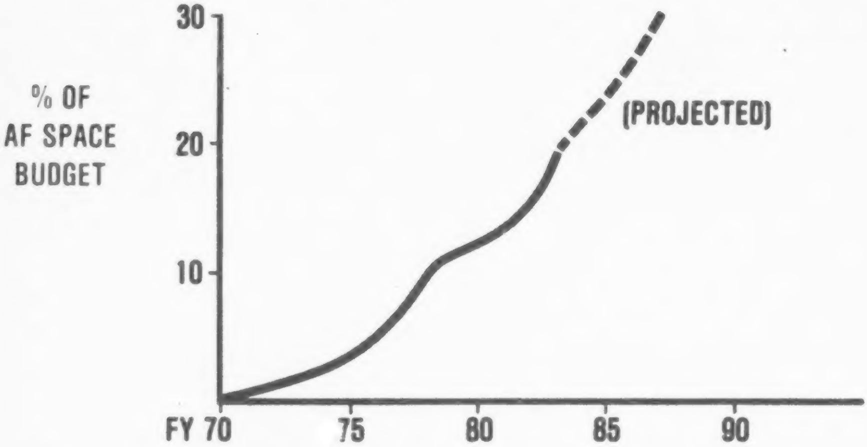
The objectives we have for fiscal 1983 in the 5-year defense program are shown on this chart. The top two objectives address the fact that we in the Air Force consider space in terms of more military capability than we have used in the past; therefore, we wish to enhance our space order of battle, buy more, if you will, to assure that we have the necessary support, and assure that those systems we put on orbit as part of our space system will survive throughout the length of conflict.

In addition, we are very conscious of the kinds of dollars that are involved and the fact that we have to make the best use of those dollars. It is our view that the way to do this involves making use of the systems we have now and continually improve them as the threat increases.

Finally, to exploit the space transportation system, the Shuttle, to its fullest because it has tremendous potential and we need to work this area.

Now, I would like to illustrate where we stand as far as survivability is concerned because there is some folklore that we are not interested in survivability.

SURVIVABILITY



You can see by this chart, these are the percentages of our dollars for hardening in this space budget. In our fiscal 1983 request about 18 percent of the dollars we are requesting are associated with making our system more viable. So, we are serious in the area of survivability and project to reach about 30 percent as we get to the end of the 5-year defense plan.

Now, we are not only working in the area of operations survivability but we also have an active technology program which is shown on this chart here.

BREADTH OF R. & D. TECHNOLOGY

[X = Technique/technology under development or study]

	Camouflage	Mobility	Proliferation	Active defense	Hardening	Replacement
Spacecraft	X	X	X	X	X	X
Ground facilities		X	X	X	X	X
Spacecraft links		X	X		X	X

A number of techniques we are working on in the technology area enhance not only the spacecraft and its survivability but also the supporting ground facilities and the necessary links that connect those ground facilities to the spacecraft.

Now, what I would like to do in the next chart is illustrate a little bit how we are enhancing our capability, how we are applying survivability and how that applies in one mission area, namely communications, as Dr. Cooper has discussed.

COMMUNICATIONS

PRESENT FORCE STRUCTURE

APPLICATIONS:

TACTICAL

LONG HAUL WIDEBAND

SIOP

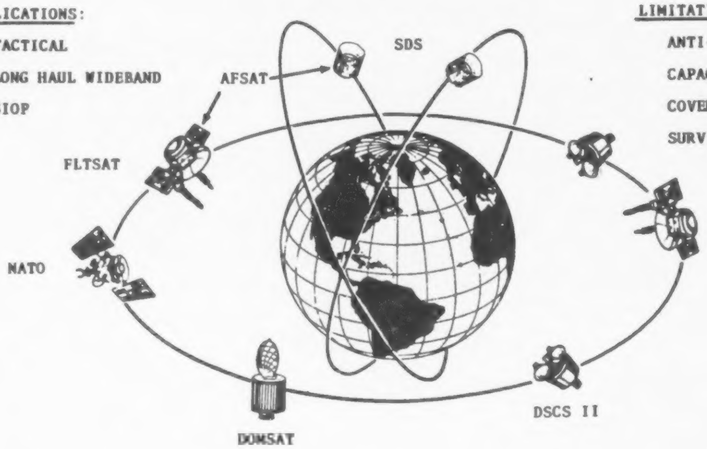
LIMITATIONS:

ANTI-JAM PROTECTION

CAPACITY

COVERAGE

SURVIVABILITY



We in the Department of Defense rely quite heavily on space communications in the tactical and strategic areas, as well as on the long-haul wideband communications. To do this we have the Air Force satellite communications program which consists of the satellites providing high latitude coverage, and using the radios on the Navy FLTSAT to provide synchronomous equatorial coverage. That is for tactical and strategic use.

In addition, we have the defense satellite communication system phase II for the long-haul high capacity communications, if you will. We also lease space, and we also have as backup some capability available on the NATO spacecraft if it is necessary. However, as this chart shows we have limitations.

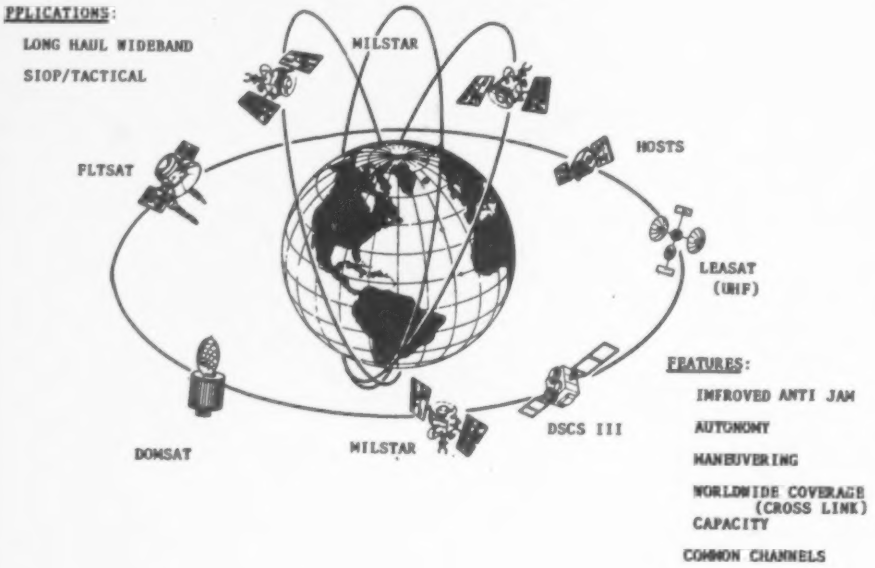
Jamming is a problem and we recognize that and have to take steps to assure our systems cannot be jammed. Also, as we become more reliant on our capabilities as far as space communication is concerned, we need more capacity, we need more coverage. Of course, those systems must survive in conflict.

So, what our program is designed to do is shown on this next chart.

As Dr. Cooper pointed out, the backbone of our space communications system for the late 1980's will be MILSTAR which will provide worldwide coverage, that is for the strategic and tractical requirements of the Army, Navy, and Air Force. This will be a highly survivable system, it will have tremendous AJ performance. We will have the necessary worldwide capacity we need for our communication requirements.

COMMUNICATIONS

PROGRAMMED FORCE STRUCTURE (1988)


PPLICATIONS:
LONG HAUL WIDEBAND
SIOP/TACTICAL
MILSTAR
FLTSAT
HOSTS
LEASAT
(UHF)
FEATURES:
IMPROVED ANTI JAM
AUTONOMY
MANEUVERING
WORLDWIDE COVERAGE
(CROSS LINK)
CAPACITY
COMMON CHANNELS
DOMSAT
MILSTAR
DSCS III

Now, the important thing to keep in mind is that this system is designed from the ground up to be a survivable system. I would like to thank this committee for assisting us in getting this program started in fiscal year 1982 by adding the necessary funds to initate this important system.

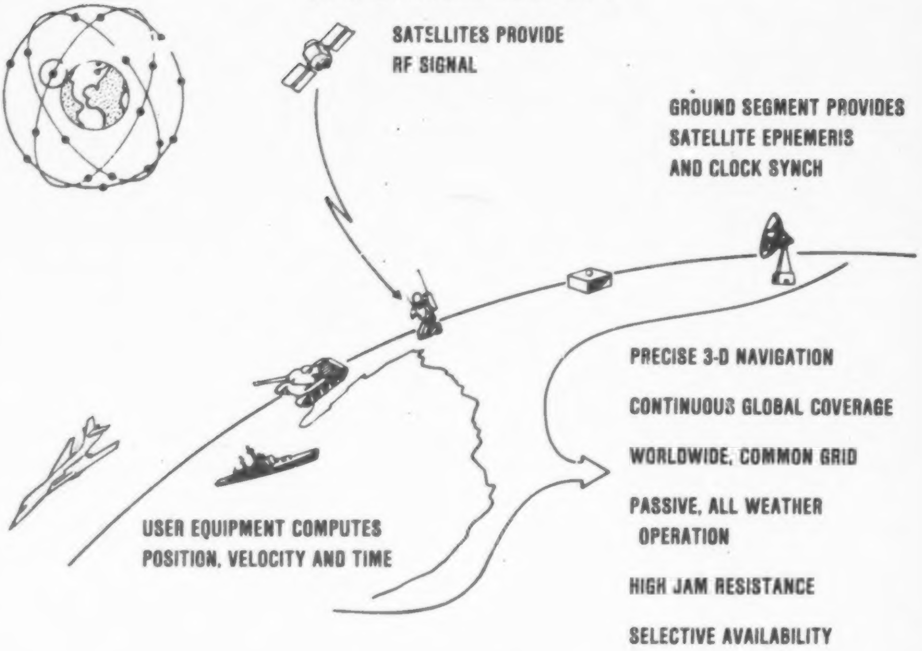
In addition, we will continue to lease LEASAT, DOMSAT, and there will be some Navy FLTSATCOMS available.

In addition to that we have the defense satellite communication system phase III. That satellite is shown in this chart. [Chart deleted.] This satellite is the latest in modern technology. It has multibeam antennas for transmission and reception; it has the control capability and capacity we need: it will be launched later in this year on a Titan IUS.

NAVIGATION

I would like now to talk about two other programs we are doing well in, one is navigation. I am sure you have heard of the NAVSTAR GPS system which has revolutionized, our capability as far as navigation. The GPS system will produce precise signals allowing us to locate ourselves worldwide to within 16 meters.

GPS SYSTEM CONCEPT


SATELLITES PROVIDE
RF SIGNAL
GROUND SEGMENT PROVIDES
SATELLITE EPHEMERIS
AND CLOCK SYNCH
PRECISE 3-D NAVIGATION
CONTINUOUS GLOBAL COVERAGE
WORLDWIDE, COMMON GRID
PASSIVE, ALL WEATHER
OPERATION
HIGH JAM RESISTANCE
SELECTIVE AVAILABILITY
USER EQUIPMENT COMPUTES
POSITION, VELOCITY AND TIME

The five spacecraft we have on orbit right now as part of our test program show we can actually do much better; therefore, we not only can we navigate but we can also accomplish blind bombing with this system. We can also fly an approach to an airfield. The signals will also be available to commercial users so our commercial airlines can have the benefit of this new system.

The production spacecraft is shown here, it is larger than the five on orbit now. [Chart deleted.] We are about to embark on the production program and with the permission of the Congress we will use a multiyear funding approach which will save $276 million over the 5-year defense program.

DEFENSE METEOROLOGICAL SATELLITE PROGRAM

The second program I would like to discuss is this particular system, the defense meteorological satellite program. We are also proposing for this satellite a multiyear buy of four spacecraft, the proposal is in our fiscal year 1983 request. If it is approved, we will save another $49 million on this program. So, we are very proud of this innovative approach and hopefully we will be able to implement it.

DMSP is a very key program to our tactical operation users in that it provides instant weather information. This particular picture shows the systems capability. We see thunderstorms in progress here. [Chart deleted.]

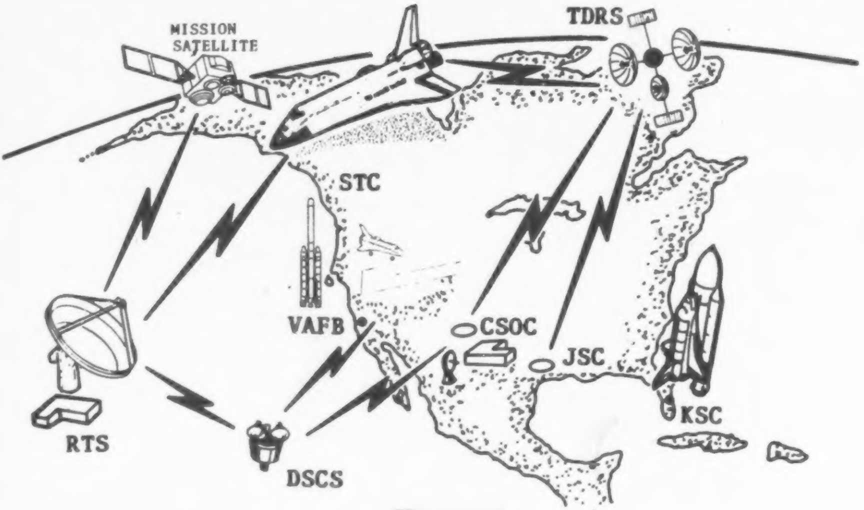
Now, of course, we have to get these systems into space and this next chart will cover our launch and orbital operation capability.

This is a rather complex chart, but I will walk through it very quickly.

UNCLASSIFIED

LAUNCH & ORBITAL OPERATIONS

PROGRAMMED



UNCLASSIFIED

At the heart is the Consolidated Space Operations Center. We will use the Center to control DOD-launched Shuttles supporting DOD missions.

In addition the Consolidated Space Operations Center will also control our mission satellites to back up and supplement the Satellite Test Center in Sunnyvale, Calif. in a vulnerable area. We are not able to expand that facility.

In addition to that, we will work with NASA to support the Johnson Space Center and of course the Kennedy Space Center to launch satellites into orbit. We will also be using Vandenberg Air Force Base to do our polar launches. The work at Vandenberg is proceeding quite well now.

This picture [deleted] here shows how it will look in 1985 when we are ready to begin launch operations. You can see the Shuttle on the launch mat, the mobile service tower. This is the Shuttle assembly facility, we had in the budget to mate the Orbiter to the various pieces of the Shuttle system. This is all part of the overall Shuttle construction that is going on now.

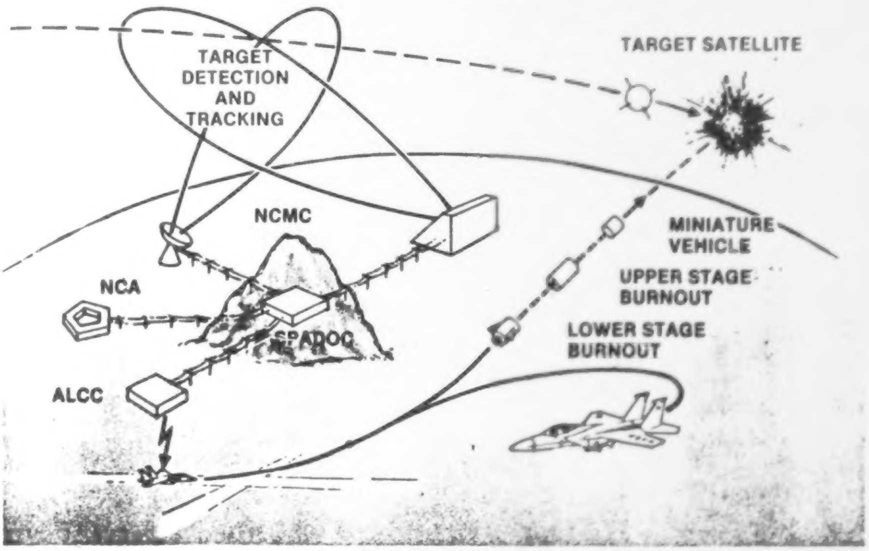
This next picture [deleted] was taken in January and shows the state of construction that existed at the time. You see the payload change room under construction and also the mobile service tower which by the way was part of the Manned Orbiting Laboratory program. We are currently modifying this tower to support the Shuttle.

In addition, we have to put those spacecraft into synchroneous equational orbit, and to do that we need this high-energy upper stage shown here. [Chart deleted.] We now have two inertial upper stages at the Cape ready to start launch operations. We would use one to launch the DSCS spacecraft this year, and the second one will be ready for launch early next year.

In addition, there are seven others in various stages of assembly, so the entire program is going along quite well. As you know, we had problems with costs, but those problems are behind us. As far as the technical operation is concerned, we are very pleased with the inertia upper stage.

I just have a few more remarks to make in regard to technology work. In the antisatellite area, we have an aggressive antisatellite program that is underway now. We will use an F-15 and a multistage missile to launch our antisatellite weapon at the target. The procedure is shown here.

AIR-LAUNCHED ASAT SCENARIO



The satellite would be tracked by our worldwide tracking network. This information, is then fed into the Norad Cheyenne mountain complex, the Space Defense Operations Center. The data will be directed and based on orders from the national command authority, passed to the air-launch control center, and inserted into the missile on the F-15. The F-15 flies out, launches the two-stage missile carrying the antisatellite weapon to destroy the target satellite. We will test this system in the very near future.

SPACE TEST PROGRAM

Other technology we are working on is the space test program. One of the interesting problems we have had in the past is that spacecraft develop a charge—just like a car does when it drives on the road. When that charge builds up to discharges, it causes damage to the space vehicle. We felt we had to test this in orbit to try to get a better understanding of the problem. We have, and we continue applying information to future design.

We will be using the Shuttle for much of our technology work. We are also working with the Europeans and European Space Agency. I will show you another chart depicting the system being tested as part of our program. [Chart deleted.]

This particular spacecraft was launched a couple of years ago and is part of a very important technology program undertaken to understand the radiation environment at low altitude, about 300 miles. We obtained good information as far as the radiation is concerned. But we obtained some additional information that we did not really expect.

This next picture [chart deleted] shows the rather startling event that happened while the spacecraft was in orbit. What you see here is a comet. That is a comet with a 3-million mile tail on it, it is moving toward the sun at 640,000 miles an hour.

Of course, I should hasten to point out that is not really the sun because you have to block the sun out in order to get the picture. So, a disc is just placed on where the sun would be. This is an important event, it is the first time we have ever been able to see such things from space.

PE 63401F SUBSYSTEMS

Finally, here are some subsystems we are working on, this is the space sextant system. As you recall, MILSTAR will be autonomous, we have to test this system. We are going to conduct the test on an upcoming Shuttle flight. When we go to operational missions, we will add a multimission navigation system which is more automatic. The area of the solar power is one area, as you know, that we have had difficulty with for some time.

We have developed a solar cell which is 50 percent more efficient than anything we have now. We have tested that cell and we will start applying it in space missions.

And then finally, the nickel-cadmium batteries we have now on orbit are not as efficient as we would like them to be. The nickel-hydrogen have much more capacity, and use a smaller space, therefore we save weight and have a more efficient operation.

Sir, that is a very quick view of the kinds of things we are doing in space.

[The prepared statement of Gen. Bernard P. Randolph follows:]

PREPARED STATEMENT OF BRIG. GEN. BERNARD P. RANDOLPH, DIRECTOR, SPACE SYSTEMS AND C^3, RESEARCH, DEVELOPMENT AND ACQUISITION HEADQUARTERS, U.S. AIR FORCE

Mr. Chairman and members of the subcommittee, I am pleased to appear before you today in support of this hearing on Space Systems. We welcome the interest of the Committee in this vital and growing area of Air Force activities. Details of these and related programs are contained in Gen. Burke's prepared statement and the Congressional justification materials which support the entire series of hearings.

My duties include responsibilities for development and acquisition of all Air Force Space Systems other than those you reviewed this morning. With your permission Mr. Chairman, I propose to enter my formal testimony into the record and use briefing aids to present first an overview of Air Force objectives in space and then specifically address selected Space Systems programs. Accompanying me today Mr.

Chairman, is Brigadier General John S. Storrie, Director of Space, Plans and Operations, Headquarters United States Air Force.

I. SPACE

Because our space systems have unique capabilities, they can perform many missions more efficiently than earthbound systems. Therefore, effective military operations on the modern battlefield increasingly depend on spaceborne surveillance, warning, communications, meteorological, and navigation support.

The Soviets are well aware of the military utility of operating in space and have committed significant resources toward a sizable space presence. Over the last decade, Soviet space launches have significantly exceeded those of the United States, with the majority of their launches being for military purposes. The Soviets are supporting an active man-in-space program, and they have deployed and continue to test an operational antisatellite capability.

The Air Force has solid plans for the continued expansion of Space capabilities and the exploitation of space for military purposes. A planning process really covers three periods. The first period is within the next couple of years. During this period, our space programs are well established and all we can change in those short periods of time, or influence, are the operational procedures and launch satellites to replace failures or to replace those ending their useful life.

The next period is within the 1985 to 1988 period. During this period, we can procure satellites currently in production or nearing the end of their development. We can make minor modifications to existing programs. We can complete ongoing projects. And we can influence the direction of our technology programs. These programs and necessary funds are now included in the five-year Defense program.

The next period is within the 1990 to the year 2000 period. This is a period of greatest flexibility of planning and of the greatest uncertainty. Depending on the pace of our technology efforts, we can make the greatest change in our capability to exploit space.

Included, in our space plans for all three periods are several goals. First, we need to expand our military capabilities in space. This is inevitable, due to the military and economic advantages of space surveillance communications, and navigation.

Second, we need to develop a confident capability to obtain free access to space. This is being acquired through enhancing our capability for reliable and responsive launch systems and protection of our satellites from those who would deny us free access.

Most importantly, we need to pursue a vigorous R&D program to give us the future military options in space.

We are proceeding with the following plan for space operations. We will make our space systems, the satellites and the ground processing stations, more survivable to attack, Specific programs are funded to accomplish this capability. We have programs to improve, through evolutionary changes, the surveillance, communication and navigation capabilities of our space systems. We've improved the robustness of our space system network by removing single nodes, procuring back-up satellites, and removing dependency on overseas ground stations.

In contrast, we are concentrating our effort on doing more with each launch by deploying satellites with multiple missions and with much longer operational life. To optimize our deployment an on-orbit capabilities, we are developing a new space launch capability, improving our space operations capabilities, and aggressively pursuing advanced, space-related technology.

The Nation's new space launch capability—the manned, reusable Space Shuttle—is being developed by the National Aeronautics and Space Administration (NASA), with extensive Department of Defense (DOD) participation. The Shuttle provides major new capabilities and offers the potential to revolutionize our operations in space. We are taking the necessary actions to transition our spacecraft from expendable launch vehicles to the Shuttle and are carefully analyzing how we can use the unique capabilities offered by the Shuttle to enhance our mission effectiveness.

The Air Force, as the DOD executive agent for the Shuttle, has several crucial responsiblities. We are developing and producing the Inertial Upper Stage (IUS), which provides the capability to deliver spacecraft from the Shuttle parking orbit to higher orbits. We are also responsible for the development, construction, and operation of the West Coast Shuttle launch and landing facilities at Vandenberg AFB, California. Polar and near polar launches will be conducted from Vandenberg AFB in support of all Shuttle users—civil as well as military. In addition, we are working with NASA to modify their existing facilities and equipment to meet unique defense requirements.

The Space Launch Support program funds DOD Shuttle operations costs and the orbital flight charge reimbursement to NASA and procures the IUS and Payload Assist Modules Delta class (PAM-D) for all Air Force space programs. Beginning in fiscal year 1983, the IUS procurement approach will be changed from an annual fully funded basis to a consolidated (Air Force, other DOD, NASA) eight vehicle buy every 2 years. This approach was adopted to reduce material and manufacturing costs.

The importance of our space assets to national security makes its essential that we maintain our current space booster capability during the transition period to Shuttle. This backup capability will protect against delays or any unanticipated problems while bringing Shuttle to an operational status. These efforts are being supported by our Space Boosters program. The program strategy is to maintain the critical Titan III production base until the Shuttle's ability to support DOD missions is demonstrated.

We are also improving our ability to operate in space. The obsolete computer systems used by the Satellite Control Facility (SCF) to control on-orbit satellites severely limits our current operations. The SCF Data System Modernization program will correct this limitation and give us the ability to better operate existing satellites and the flexibility needed to control more sophisticated satellites currently in development.

We are also continuing work on the new Consolidated Space Operations Center (CSOC). For management, operational, and economic efficiencies, CSOC combines two major space missions for DOD: satellite control, and Space Shuttle flight planning, readiness and command/control. In the role of satellite control, CSOC will enhance our operational capability by providing greater mission responsiveness and increased survivability. With regard to survivability, the Satellite Test Center and CSOC will provide mutal emergency backup for mission essential functions should outages occur at either center. In its other role, CSOC will directly control DOD Shuttle missions and enhance protection of national security information. During early Shuttle operations, this function must be performed by the NASA Shuttle control facility at Johnson Space Center (JSC), but JSC is very limited in its ability to conduct highly classified operations. Survivability for this function will also be increased by having two facilities, with JSC serving as the backup to CSOC for DOD missions.

The Air Force is committed to maintaining the technical superiority of our space systems through continual testing of new concepts and by investigating the effects of the space environment on our systems. The Space Test Program (STP), Space Vehicle Subsystems, Advanced Military Spaceflight Capability, as well as various Technology Base projects, support this objective.

The tri-service STP provides the spaceflights for DOD experimental payloads needed to gather information critical to the development of future space systems. STP simplifies the experimenter's job by centralizing management for the tasks needed to launch a payload. Furthermore, STP has been designated by DOD to lead in developing the Space Shuttle as a manner space laboratory.

The Space Vehicle Subsystems program investigates promising space vehicles subsystems technologies which offer improvements in the effectiveness, efficiency, weight, and survivability of our space vehicles. Current efforts are focused on space guidance, space power supply, satellite secondary propulsion, and space computer technologies.

The Advanced Military Spaceflight Capability program is a fiscal year 1983 new start which will provide the technology to permit the development of a quick response, flexible, survivable, and economical military space transportation system in the mid- to late-1990s. We plan to define the military utility of alternative configurations and develop the pacing of exceptionally promising technologies. We have instructured the program to allow us to decide in the mid- to late-1980s whether to proceed with system development of any of the concepts.

Two major satellite programs included in the Space mission area are the Defense Meteorological Satellite Program (DMSP) and the Navstar Global Positioning System (GPS). DMSP satisfies our need for accurate and timely weather data, which is vital to successful military operations. DMSP, an operational advanced weather system, is DOD's most important single source of weather data. Our procurement program involves acquisition of replacement satellites, launch systems, and special sensors.

Successful military operations also require a knowledge of the location of force elements. We are developing Navstar GPS to meet this requirement by providing users in all services with precise position information on a 24-hour, global basis under all weather and visibility conditions. This capability will significantly enhance the mission effectiveness of all U.S. forces. In addition, the system holds real promise for numerous civilian applications. GPS satellites will also play another vital defense role by being hosts for Integrated Operational Nuclear Detonation Detection System (IONDS) payloads. IONDS will provide damage and strike assessment information, thereby enhancing strategic force management. Very accurate global detection and reporting of nuclear detonations will be available for the first time when this system is deployed.

II. COMMAND, CONTROL, AND COMMUNICATIONS

Many command, control, and communications (C^3) systems are space systems and are essential to implement strategy, control forces, and employ weapons in modern warfare. These systems support day-to-day operations, provide time-critical warning information to decision makers, facilitate accurate situation monitoring and allocation of resources in crisis situations, and permit the appropriate and effective employment of military power in wartime. Recognizing our dependence on C^3, the Soviets place heavy emphasis in their doctrine on the disruption of C^3. The threats include both physical and electronic attacks.

In response to this growing threat, our primary objective is to increase the survivability, security, and jam-resistance of our C^3 links. Another objective is to improve both the reliability and interoperability of our systems. Finally, we want to exploit new technologies to more effectively meet future threats and satisfy our C^3 requirements.

One of the key features of the President's strategic program is the modernization of strategic C^3. For deterrence to be a successful strategy, we need effective strategic C^3 systems to support the employment of our nuclear forces. In the past, we have not modernized our C^3 systems fast enough. As a result these systems have insufficient survivability and reliability to operate reliably over an extended period following a Soviet attack. Consequently, we are increasing the survivability and endurance of our strategic C^3 systems. Our objective is to make these systems as strong as the forces they support.

A primary program for command and control of our strategic forces is the Air Force Satellite Communications (AFSATCOM) System. The AFSATCOM system consists of aircraft terminals ground terminals, and communications packages on several satellites, including the Fleet Satellite Communications (FLTSATCOM) System, Satellite Data System (SDS), and classified host spacecraft. We are installing AFSATCOM terminals in strategic bombers, reconnaissance and surveillance aircraft, ground and airborne command centers, and missile launch control facilities. The Army and Navy are also acquiring terminals. For fiscal year 1983, we are requesting procurement funds for an AFSTACOM communications package to be integrated on host spacecraft to ensure continuity of communications in critical geographic areas.

SDS is a major part of the AFSATCOM system and provides critical two-way transpolar command and control communications for our nuclear capable forces. SDS also supports a data communications network among remote tracking stations and the Satellite Test Center for command and control of our satellites. The fiscal year 1983 RDT&E program completes development of a Shuttle-compatible spacecraft and the procurement program sustains the capability to launch satellites to replenish the orbital constellation.

For the future, we are developing a new satellite communications system called MILSTAR to fulfill the urgent need for highly jam-resistant and survivable satellite communications. MILSTAR will feature increased jam-resistance through the use of extremely high frequency (EHF) communications and increased survivability through a variety of techniques. It is a joint Army, Navy, Air Force program which will support both strategic and tactical users.

DSCS provides unique and vital national security communications for worldwide military command and control, crisis management, intelligence and early warning data relay, treaty, monitoring and surveillance information, and Presidential and diplomatic traffic. Our remaining DSCS RDT&E task is to develop DSCS III satellites. DSCS III will provide increased capacity, flexibility, and electronic counter-countermeasure capability. In support of strategic forces, they will also include a UHF/SHF capability for emergency war order dissemination and force execution. The DSCS procurement program provides for replacing DSCS II satellites with DSCS III. Two DSCS III satellites will be procured in fiscal year 1983.

III. OTHER STRATEGIC DEFENSE

The Defense Support Program is a key element of our Nation's strategic defensive posture. This program provides data to the National Command Authorities, North American Aerospace Defense Command, and Strategic Air Command. Our development efforts are aimed at increasing the survivability of operational data through the development and deployment of truck-mounted Mobile Ground Terminals, improving the performance and life expectancy of follow-on satellites, and enduring that follow-on satellites are compatible with the Space Shuttle. To maintain the operational capability of this vital system, new satellites must be procured to replace those that have failed, worn out, or are unable to meet the growing threat. To meet near-term requirements, four more DSP satellites are being procured, two in fiscal year 1983 and two in fiscal year 1984.

The Space Laser program has been initiated in accordance with Congressional direction to determine the utility and feasibility of space laser weapon systems. We recognize the need to have a much sounder base of research and advanced technology in this area before weapons development decisions can be made, and we are directing our efforts toward that end.

The Space Defense Systems program is continuing the development of our own operational antisatellite capability to deter Soviet ASAT use and, if necessary, enable us to destroy hostile space systems that threaten our forces.

This concludes my statement. If there are no questions at this time, I will proceed with my briefing on the Air Force role in Space.

Senator **Warner**. I am envious of your job and would like to have it. [Laughter.]

Senator Jackson.

SECURITY OF OUR SATELLITE SYSTEM

Senator **Jackson**. To the extent you can comment in open session I would like to get your judgment about the security of our satellite system. Much has appeared in the press about the growth in Soviet capability to interdict and destroy our satellites, which are so important world wide in areas affecting national security.

Could you coment on that, how you see it?

General **Randolph**. Senator, I think it is clear that the Soviet low-altitude antisatellite weapon does pose a threat now to our lower flying satellites.

However, we have not seen any demonstration of capability at the higher altitude. Therefore, we must conclude that our satellites flying up at the synchronous altitudes are quite survivable today.

However, we are concerned about the activity that the Soviets have in the antisatellite area and as a result of that concern our request includes the kinds of dollars that you see in the budget, to insure we maintain the survivability over time.

Senator **Jackson**. The other question I have, how does our overall investment compare, both in quantitative and qualitative terms, as far as space is concerned?

The Soviets have had much more time on these long, protracted voyages into space. They have developed space platforms, I assume, to a greater extent than we have. How do you compare them to us at this point, quantitatively and qualitatively? You have answered part of it in terms of the quantitative aspect as part of your presentation.

I guess it is the qualitative area that concerns me and clearly, for example, the Shuttle program offers enormous possibilities involving many, many different disciplines. They do not have anything comparable to that. Do you see any evidence that they are going in that direction? To the extent you can comment in this open session.

SOVIET BOOSTERS

Dr. **Cooper**. Yes, sir, we do see the Soviets working on sizable new boosters. Boosters in a class able to put certainly more than 100,000 pounds into lower orbit, a class similar to that of the Saturn V. We also see activity related to a space plane we believe will be similar in some aspects to the Shuttle and probably will be associated with their SALYUT Space Station.

That is, it will be able to dock and shuttle astronauts from the ground to that space station and back again.

We also believe that they do have a vigorous manned space program for military purposes primarily, although we do know that they carry out scientific experiments on that platform as well.

Senator **Warner**. Senator Quayle.

Senator **Quayle**. Thank you, Mr. Chairman.

SURVIVABILITY

Senator **Jackson**. Thank you, Mr. Chairman.

I wonder if you might just amplify on this issue of survivability. Every time it seems we get into a discussion on a satellite program such as GPS, or any space program, the first issue comes up, it is not survivable and therefore we ought to concentrate on something else.

I wonder if you might just for the record state in categorical terms the survivability aspects of our space program. And then, on a comparison basis, to compare the survivability of our space program to say, some of our land-based programs that we have.

General **Randolph**. Well, I think the issue of survivability is one that has been misunderstood. I will have to say that maybe we have not articulated how survivable our systems are.

It is simply, if you take a single spacecraft or a single tank, or a single airplane, or a single person, there is no doubt that someone can develop a weapon that will destroy that spacecraft, tank, aircraft, or person.

The facts are, though, that when you take a look at the system aspects and the complexity of trying to reduce the performance of a space system on orbit, given certain minimal survivability measures, you have now developed yourself a rather complex problem that, first of all, costs a lot; second, it is very difficult to do; and third, takes a lot of time to accomplish. It provides—if in fact the person or the adversary is to succeed—provides a considerable amount of warning information that would be very useful for us to make use of other weapons.

So, I guess the bottom line is that systems as they exist today are quite survivable. I believe the Soviets, our potential enemy, can develop a capability which will cause problems for one of those systems and, therefore, because we recognize that potential exists, we have the active survivability program. I showed this on the charts, whereby we are increasing the amount of money spent in the area of survivability to some 30 percent of the hardware budget for fiscal 1987, and some 18 percent of the budget for fiscal 1983.

So, I think the programs we have today are in fact survivable and I think they can be made more survivable on a system basis. Obviously, an individual spacecraft can and will be destroyed if a determined enemy wants to do that, just as an individual aircraft can and will be destroyed, or a tank, or an individual person.

Senator QUAYLE. This issue does not just come up in Congress, but from a number of people in the military; they refer to survivability problems.

General RANDOLPH. Yes, sir, you are right.

Senator QUAYLE. So, I would say to you in all candor that our educational process ought to be a dual approach for some of our people in the military establishment as well as those of us on the hill, that this is not that much of a liability, particularly on a comparative basis.

General RANDOLPH. That is correct.

THE SOVIET THREAT

Senator QUAYLE. One other question. Maybe you got into this before I arrived here. Where are we going in the space program vis-a-vis the Soviet Union, and what do we really have the most fear of down the road if we would not concentrate our effort in a substantive, significant space program?

I realize there may be some restrictions in an open session, but could you go as far as you possibly can in outlining the threat and some of the problems that we see down the road vis-a-vis the Soviet Union?

Dr. COOPER. Yes, I would like to answer that question because the question of what future warfare is going to be like and how space systems will influence that future warfare, is something that we are spending a good deal of time trying to understand in Defense today.

The view of the future of warfare is that surveillance and targeting, real-time targeting, using surveilliance sensors, will be an important, perhaps even a revolutionary influence on warfare in the future.

When you combine the real-time surveillance capabilities which we are developing today, which space systems play heavily in, with smart weapons that are able to fly out, autonomously acquire a target in terminal phase, and then direct a warhead, conventional or nuclear, to destroy that target, you create a major, new threat that has to be dealt with by military systems of all types.

RECONNAISSANCE SATELLITES

We face that threat today from space with the Soviet Union with respect to their radar ocean reconnaissance satellites and their electronic intelligence-gathering satellites for our major capital ships because those ships can be seen and located precisely from Earth orbit. That information can be relayed to weapon platforms that can release smart cruise missiles or other kinds of weapons towards those ships. It does represent a major threat.

We feel that in the future remote sensors of this sort, located in space as well as sensors carried on aircraft and other sensor platforms, will provide that kind of target information not only for surface shipping but also for the general battlefield. The targeting will then be done remotely. That means that the whole concept of masked forces—either in naval warfare, inland warfare, or in air warfare—may well be a thing of the past in the decade of the 1990's.

You can see the tremendous change that may be beginning with this new surveillance regime that we see in the future. It is a regime in which space clearly will play a major role, if not the dominant role. That is why it is so important.

Senator Quayle. Do you think we will need a manned space station as the Soviets seem to be using?

Dr. Cooper. Well, as you know, we do not have a manned space station, although we do have a manned orbiting vehicle in the Space Shuttle.

MANNED SPACE PLATFORMS

There is a proposal now in front of the Congress, in the form of proposals by NASA, to begin to design a manned space station.

Many studies have been done in the Defense Department in the last 10 years which have looked at the potential military uses of manned space platforms. They have not shown enough promise to make it an imperative that the Defense Department proposes to develop and build such a platform although we have some interest in potential applications of manned space stations.

None of them were so imperative in relationship to other ways of doing the jobs that one might expect to be able to do from those space platforms that it made us go ahead with the programs.

But since NASA is proposing to do this and since it will be essentially an experimental capability, we are supporting NASA in their study efforts. We are working with them to find out how we can experiment with that space capability when it is developed so we can determine what the military potential of space platforms may be.

Senator Quayle. And you are satisfied working with NASA, you do not see a separate request coming from military use of the planned manned space station?

Dr. Cooper. That is correct.

Senator Quayle. Thank you, Mr. Chairman.

Senator Warner. Thank you very much.

We will now hear from General Lamberson in more detail.

STATEMENT OF MAJ. GEN. DONALD LAMBERSON, DIRECTOR, DIRECTED ENERGY PROGRAM COORDINATOR (U.S.D.R. & E.)

General Lamberson. Mr. Chairman, I should like to make a summary statement and provide my full statement for the record.

I am honored to testify today in anticipation of assuming a position within the Office of the Secretary of Defense as described by Dr. Cooper. This position will include the central focus and the direction of the directed energy weapon technology programs within the Department of Defense.

I think the creation of this position reflects the concern both of the Congress and of the Department of Defense for centralized management of the Army, Navy, Air Force, and DARPA directed energy programs. I centainly feel that concern even before taking the office.

SPACE LASER PROGRAM

The space laser program pertinent to today's hearing is one of those programs, and I would like to say a few words about my goals and objectives for that program as well as the current status of the space laser program.

I bring to the office, sir, 10 years of experience in directing high-energy laser technology. In addition to that, as Dr. Cooper said, during the last 4 years I have directed the conventional armament acquisition of the Air Force in all phases, from technology phase to early production.

The point is that I am very sensitive to the requirements and risks in transitioning from technology to production. I am convinced that we are entering the era in which directed energy technology can confidently be transitioned into weapons systems. I think this applies in particular to space weapons.

But I believe that we are not at that point today. Let me summarize current status.

The Air Force, DARPA and the Army, have been working since September of 1981 to develop a joint program to resolve the known uncertainties associated with potential feasibility and utility of space laser weapons. I would like to say that Dr. Charles Cook, on my left, was the chairman of the ad hoc group.

DOD's space laser program plan is in its final stages of preparation and I intend to make a matter of highest priority the review of the plan prior to its submission to the Congress.

This DOD plan draws heavily from the results of the DOD report to the Congress in may 1981 and the associated Defense Science Board [DSB] review of that report.

It incorporates efforts that are currently underway by DARPA, the Army, the Air Force, and those programs to be added as part of the approximately $50 million a year enhanced funding for fiscal years 1982 through 1987 as committed by the Deputy Secretary of Defense. This additional funding will allow increased Air Force participation in the space laser program.

There are some obviously attractive benefits in using laser weapons in space. Without the atmosphere, the laser beam, as you know, is not disturbed from the weapon to the target. Thus, lasers have the potential to transmit damaging energy at the speed of light over very long distances.

Furthermore, lasers are not weapons of mass destruction, they direct energy to a specific point on a target and nowhere else.

However, there are also many uncertainties which would make a space-based weapon commitment today very risky in my judgment. These are identified in seven major task areas listed in order of priority as we shall attack them.

They are target vulnerability and hardening; the utility of a space laser; survivability of a space laser weapon system; what the definition of that system is; the baseline technology which is so necessary to make the systems possible—the DARPA Triad program that Dr. Cooper previously discussed; the enabling technology to get from where that program is and what it will demonstrate on the ground to what is necessary to put the weapon system in orbit; and the growth technology such as the visible laser that Dr. Cooper eferred to, to give growth.

The DOD space laser program is specifically focused to attempt to resolve these uncertainties and to allow an informed weapon system commitment. The goal is to provide realistic estimates of the utility and cost-effectiveness of space laser weapons for a broad range of missions.

The extent to which space lasers can address these many missions is simply not clear today. The planned program will attempt to provide the initial answers.

The largest part of the technology program, as you have heard, will remain the DARPA space laser Triad program. The total DOD program resources, again as Dr. Cooper has said, for the fiscal years 1982 through 1987 are approximately a billion dollars with well over half of that in the DARPA technology program.

I am pleased to note some progress has been made in the past year on these space laser programs. The DARPA Triad programs has witnessed the experimental verification of several key technologies at the subscale level and the initial designs of the demonstration hardware have been completed.

Also, as you are aware, the Air Force has recently established the new Space Laser Program Management Office at its Space Division.

In conclusion, Mr. Chairman, I want to assure you of a positive, aggressive program to use the resources provided by the Congress to resolve the key uncertainties which will allow us to move confidently and knowledgeably to space laser weapons.

I will be sensitive to the "show-stoppers" which may preclude space laser weapons, but I will be equally sensitive to the technology breakthroughs which may allow our plans to accelerate. I will inform the Congress as appropriate of these developments and I intend to be responsive to your guidance.

Thank you very much.

[The prepared statement of Gen. Donald L. Lamberson follows:]

PREPARED STATEMENT OF MAJ. GEN. DONALD L. LAMBERSON, USAF, OFFICE OF THE UNDER SECRETARY OF DEFENSE FOR RESEARCH AND ENGINEERING

Mr. Chairman, I am honored to testify today in anticipation of assuming a position within the Office of the Secretary of Defense. This position, within the Office of the Under Secretary of Defense for Research and Engineering will include the central focus and direction of directed energy weapon technology programs within DOD. The creation of this position reflects the concern of both DOD and the Congress for centralized management of the Army, Navy, Air Force, and DARPA directed energy programs. The space laser program, pertinent to today's hearing, is one of those programs. I would now like to say a few words about my goals and objectives and the current status of the space laser program.

I bring to the office ten years of experience in directing high energy laser technology. In addition, during the last four years I have directed the conventional armament acquisition of the Air Force in all phases from technology base to early production. The point is that I am very sensitive to the requirements and risks in transitioning high technology programs from development to production. I am convinced that we are entering the era in which directed energy technology can confidently be transitioned into weapons systems. That applies, in particular, to space weapons. But we are not at that point today. Let me summarize the current status.

The Air Force, DARPA, and the Army have been working since September 1981 to develop a joint program to resolve known uncertainties associated with the potential feasibility and utility of space laser weapons. A DOD space laser program plan is in its final stages of preparation. I intend to make a matter of highest priority the review of that plan prior to submission to the Congress.

This DOD plan draws heavily from the results of the DOD report to the Congress of May 1981 and the Associated Defense Science Board review of that report. It incorporates efforts currently funded by DRAPA, the Army, and those programs to be added as part of the approximately $50M per year enhanced funding for fiscal year 1982-87 as committed by the Deputy Secretary of Defense. This additional funding will allow increased Air Force participation.

There are some obviously attractive benefits for using laser weapons in space. Without the atmosphere, the laser beam is not disturbed from the weapon to target. Thus, lasers have the potential to transmit damaging energy at the speed of light over very long distances. Furthermore, lasers are not weapons of mass destruction. They direct energy to a prescribed target area and nowhere else. However, there are also many uncertainties which would make a space-based weapon commitment today very risky. These are identified in seven major task areas listed in order of priority: Target vulnerability and hardening, utility, survivability, system definition, baseline technology demonstration (DARPA Triad), enabling technology, and growth technology. The DOD space laser program is specifically focused to attempt to resolve these uncertainties to allow an informed weaponization commitment.

The goal is to provide realistic estimates of the utility and cost effectiveness of space laser weapons for a broad range of missions. It is simply not clear the extent to which space lasers can address these missions. The planned program will attempt to provide the initial answers.

The largest part of the technology development will remain the DARPA space laser Triad program (Alpha, Lode and Talon Gold).

Total DOD program resources for space laser R. & D. (fiscal years 1982-87) are approximately $1 billion with over half of that contained within the DARPA budget and the remainder primarily within the Air Force budget.

I am pleased to note the progress that has been made in the last year on these programs. The DARPA Triad program has witnessed the experimental verification of several key technologies at the subscale level and the initial designs of the demonstration hardware have been completed. Also, as you are aware, the Air Force recently established a new space laser program management office.

In conclusion, Mr. Chairman, I want to assure you of a positive, aggressive program to use the resources provided by the Congress to resolve the key uncertainties which will allow us to move confidently and knowledgeably to space laser weapons. I will be sensitive to the "show-stoppers" which may preclude space laser weapons. But I will be equally sensitive to the technology breakthroughs which may allow our plans to accelerate. I will inform the Congress as appropriate on these developments and I intend to be responsive to your guidance.

Thank you very much.

Senator WARNER. Thank you. We would like to also have Dr. Cook on record here. Do you have some comments?

STATEMENT OF DR. CHARLES COOK, DEPUTY ASSISTANT SECRETARY FOR SPACE PLANS AND POLICY, USAF

Mr. COOK. Mr. Chairman, I would like to say a few words about space policy as we see it today.

In my view, you can separate the activities of space policy into four parts at the moment. The first part is the existing body of space policy statements that we have on the books. As you all know, we have the National Space Act of 1958 that set up NASA and defined the DOD's role with regard to space.

We have the Outer Space Treaty of 1967 that specified that space should be used for peaceful purposes.

We have the ABM Treaty of 1972 that indicated that there should be no development, testing, or deployment of space-based ABM's.

We have the Presidential Directive 37 which is the general space policy. It spoke to cooperation in space, free access to space, and designated NASA to develop the Space Shuttle.

We have Presidential Directive 42 which is the civil space policy statement that talked to technology transfer, it talked about commercial involvement, and it indicated that at that particular time there would be no initiative of high challenge in the space area.

So, this is one part of the area that plays in the space policy considerations today.

UTILIZATION OF SPACE

The second part I would like to mention is the substantial growth in the utilization of space. We have seen this in General Randolph's statement about how the utilization has grown, the many things that we are doing with regard to weather, navigation and communications across the board as far as military application of the space systems.

We have a whole family of launch vehicles—we have the Titan, the Atlas, Delta, Thor, and now the Shuttle, taking man back into space.

ADVANCES IN TECHNOLOGY

The third part that I would like to talk about is the advances in technology. Those advances that will allow us to do more in space than we have in the past. The real-time aspect of our space systems is the relatively new development that we use. We have data processing; we have microelectronics; we have new data links; we have the Shuttle; we have antisatellite technology, and we have the laser.

So, here we have the advances in technology that are going to allow us to do new things in the space area.

The last part is the external environment. We have heard much about this already today: What the Soviets are doing, their development of weapons, and lasers. Other countries are becoming involved. The French are involved. The Japanese are involved. The space arena is becoming much more multinational.

So, as we look at policy with regard to all of these, we see that the policy of this country with regard to space needs to be updated. In fact, the administration is doing just that. The assignment has been made to the Office of Science and Technology Policy to update the space policy of the country. This is going on at this very moment. The DOD and the Air Force are very much involved. You will be seeing some of those results coming out this summer.

Senator WARNER. Can you be a little more specific on the timeframe, please, of that policy formulation?

Mr. COOK. The policy statements were due to be developed in about the April timeframe, I believe. I believe they are running a little bit behind schedule. But I would expect in the late spring or early summer, you will begin to see it coming out.

It is a very extensive effort. It is going to cover a number of very important areas including future launch vehicles, organization to accomplish it, new policy statements and perhaps new legislation that should be developed. So, it is a very comprehensive view of the whole policy area.

CIVILIAN AND MILITARY STUDIES

Senator WARNER. Embracing both civilian and military?

Mr. COOK. Yes, that is right.

Senator WARNER. Have you seen confidential studies? How are we treating the two subjects, the division between the two?

Mr. COOK. I believe there is one big group that comes together and involves NASA, NOAA, the State Department, DOD, and they are all working together on these issues.

SPACE WEAPONS

One of the big issues that you have heard today is with regard to space weapons. That is one where national policy is needed at this point in time because of the advances in technology that make some of these things possible. That is one that they will be wrestling with to a very large degree.

So, that is the extent of what I would like to say about where I think we stand on space policy.

Senator WARNER. I will address these questions to you, Dr. Cooper, but feel free if the other members of the panel wish to contribute.

Toward what end should we be pursuing the technologies being developed under the DARPA's Triad program? Is the purpose for it to be developed to test the integrated space-based laser system, albeit one of somewhat marginal military capacity; or should it be pursued simply as a technology development effort not intended to lead to a near-term deployment in space?

Dr. COOPER. Well, we in Defense have, as I have said before, viewed this technology program and the next 5-year period of time as the technology confirmation period. What that means to me is that we are clearing up the known uncertainties in the technology areas toward a decision in the latter part of the 1980's as to whether we should go ahead and demonstrate a weapon capability in space.

I believe it is beyond prudent risk at this time to move that technology toward deployment of a weapon system until we have substantially reduced the uncertainties involved.

I think there is high potential in the technology we are developing. There is a great deal of lack of unanimity in the technical community about the capability of the technology that we are working with. But I believe that it is a substantial technology. It could be useful for a weapon system. The risks and uncertainties will have to be resolved before we will really be able to tell on that score, but I believe the technology we are working on is credible and could potentially be useful as a weapon system of the future.

SPACE-BASED LASER ABM SYSTEM

Senator WARNER. Would a space-based laser ABM system require modification on the ABM Treaty?

Dr. **Cooper**. Yes, I believe it would, although there is differing opinion on that. The current ABM Treaty does not allow the deployment of ABM components in space. But I believe at the time that treaty was concluded the protocols associated with the treaty would indicate that the component treaty that was alluded to there was a conventional ABM component treaty—rockets and radars, and such things.

I would suspect that before we could go ahead with that, that we would have to verify that conclusion.

Senator **Warner**. Doctor, as you know, we are going to have a second panel later this afternnon. While I think it would be fairer if they were to present their case and you have a rebuttal, in view of the fact that you must depart, would you care to comment on what I regard as a very constructive piece that General Graham has provided? I believe you have studied it. Do you have some differences of viewpoints with the General?

Dr. **Cooper**. Well, yes, I have indeed read the report that General Graham and his group have recently published. I believe I would generally agree with General Graham that we have neglected to a certain extent the concepts of defense.

CREDIBLE STRATEGIC DEFENSE

I believe the thrust of General Graham's report, as I understand it, is to renew our interest in defense and to take advantage of technologies that may be available in the near term to build a credible strategic defense.

I would subscribe to those principles generally. The question is what are the technologies and what is the cost. How does it relate to our strategies, our general strategic offensive strategies in the broadest sense.

I would guess some of the technologies that are alluded to in the report are probably not pure enough yet to sustain the performance that is subscribed to in the report. There are technical uncertainties both in conventional and ABM weaponry, certainly in space-based laser weaponry, and some of the space technology that was proposed to be employed in a strategic defensive strategy.

I do believe that we need some additional work in those areas, particularly in the space laser weaponry area.

On the other hand, again, I subscribe to the general principles. The question is mainly one of cost, our assessment of what the cost may be. I believe that you would get a wide diversity of opinion on the scale size of an effort required to create a credible strategic defense capability at this time.

That would be in an area where I probably would be somewhat at variance with General Graham's conclusion in that report.

SHORTER WAVELENGTH BEAM VERSUS CHEMICAL

Senator **Warner**. Back to the laser system again. I have examined some of your testimony in the House in which you were evaluating the merit of a shorter wavelength versus the chemical. Do you feel that we might be proceeding too quickly in the chemical area, that it would be absorbing a great deal of our funding and thereby jeopardizing it?

I understand you to say that a more promising technology is the shorter wavelength laser.

Dr. COOPER. Yes, I do believe that. Just the basic fundamental physicial principles would tell me that shorter wavelength lasers would be more desirable.

That does not mean current chemical laser technology is not now desirable to pursue as a potential laser weapon. As a matter of fact, I believe that it is credible to pursue. We have structured a program that will engineer a demonstration system in the near term and will provide substantial supporting technology, both in the laser development itself, in beam control, and in certain high-powered mirror technology that will be applicable not only to chemical lasers but also to short wavelength lasers.

The problem right now with the short wavelength lasers is that we do not have a good, low-risk prime candidate for a very high-powered short wavelength laser. We are pursuing that vigorously as a growth option, "growth potential," in this business.

I wish I could report to you today of a breakthrough, prime candidate, or good possibility. But each one of the things we are pursuing today has some problem, some basic flaw in it that we are going to have to overcome in order to make it a credible, potential weapon. We are doing that vigorously and I am hopeful we will succeed.

Senator WARNER. General Lamberson, do you want to provide your views on that subject?

General LAMBERSON. Only to add, sir, that I agree that the laws of physics argue for going to shorter wavelengths, and that is why the push is on to do that. It is important, particularly as we look at the space aspects, to understand the energy mechanism from which these lasers are supplied.

Many of the short wavelength lasers are excited electrically. That is not particularly a problem on the surface of the Earth, but it is a real problem in space. So, we have to multiply that efficiency of the laser by the efficiency of generating that power in space. That certainly is one of the trade-offs I think Dr. Cooper is alluding to. We do not have the depth of understanding of the electrically excited lasers as we do for the chemically excited lasers. That is one of the things we will be looking at very closely.

Senator WARNER. Gentlemen, we have to put in the record testimony, in my judgment, on the ground versus the space-based laser system and whether or not we should not be putting some funding in, more on the ground and try that before we waste it on space.

Dr. COOPER. Well, we have a vigorous program in our ground-based high-energy laser weapon technology. We have particularly looked in the past several years at the prospect of ground-based systems.

We are continuing to pursue that technology and will be funding efforts in that area over the next few years to demonstrate that capability.

General LAMBERSON. Mr. Chairman, in addition to the ones that you described, there are also the airborne activities which have some of the advantages of operating from the ground. They have the advantage over the ground-based systems in that you can put the airplane where you want it.

I believe that as this class of weapons matures, we also need to understand that trade-off better than we do today.

Senator **WARNER**. One final question. What consideration has been given to taking a less-than-mission-capable laser system assisting an off-the-shelf component and then integrate them in a space platform?

Dr. **COOPER**. Mr. Chairman, we have given some consideration to what a demonstration in space of high-energy laser weapon technology would do for us. We have made the trade-off between the enormous cost of doing experiments in space and the corresponding cost, but perhaps lesser stress, of doing those demonstrations on the ground.

Each time we have looked at that, the answer has come up, "Do as much as you can on the ground because it is the most parsimonious application of funds that you can have, and consequently you will make faster progress that way." It has been our approach to continue in that line.

ADEQUATE FUNDING?

Senator **WARNER**. This brings back a threshold question here, Is the funding adequate? You used the word "parsimonious."

Dr. **COOPER**. Yes, it clearly is a trade-off of dollars. We could follow many parallel paths in this program, but we believe that the path that we are on is cost effective and will get us to a solution of the problems that we have as rapidly as possible.

Senator **WARNER**. All right, we will adjourn at our appointed hour of 3:30 and reconvene at about 3:45 for the second panel.

[Questions submitted by Senator Warner with answers supplied follows:]

SPACE-BASED LASERS: ABM TREATY

Senator **WARNER**. Dr. Cooper, would a space-based laser ABM system be contrary to and require modification and/or abrogation of the ABM treaty?

Dr. **COOPER**. The ABM treaty bans the development, testing, and deployment of all ABM systems that are space-based; however laboratory research is permitted. Modification of or withdrawal from the treaty would be required before development, testing, or deployment of a space-based laser ABM system. Ballistic missile defense is, however, the most demanding mission for a space-based laser weapon system, and less capable systems could be developed for other missions, such as attacking satellites or high flying aircraft. Development, testing or deployment of an anti-satellite or air defense space-based laser weapon system is not prohibited by the ABM treaty unless it has a distinct capability as an ABM system.

Senator **WARNER**. At what point would its development require such a change?

Dr. **COOPER**. The term "development," as defined in the ABM treaty context, was explained by the (then) Director of the Arms Control and Disarmament Agency, Gerard Smith, on July 18, 1972, in testimony to the Senate Armed Services Committee:

"The prohibitions on development contained in the ABM Treaty would start at that part of the development process where field testing is initiated on either a prototype or breadboard model. It was understood by both sides that the prohibition on "development" applies to activities involved after a component moves from the laboratory development and testing stage to the field testing stage, wherever performed. The fact that early stages of the development process, such as laboratory testing, would pose problems for verification by national technical means is an important consideration in reaching this definition."

Senator **WARNER**. I thank you very much, gentlemen.

Dr. **COOPER**. Thank you very much.

[Whereupon, at 3:30 p.m. the subcommittee proceeded to other business.]

SPACE SYSTEMS—Continued

The subcommittee met at 4:30 p.m. in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senator Warner.

Staff present: Frank J. Gaffney, Patrick L. Renehan, James C. Smith, professional staff members; Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. Ladies and gentlemen, I apologize for my tardiness. There are 472 top graduates of high schools from all over America upstairs in our big caucus room. They have come, and I was one of two speakers today. I felt it was necessary to tell them about what is going on in the Senate today.

I closed with a description of this hearing and the importance of it. I can assure you, of the dozen or so subjects that I covered this was the one that held their attention. You could have heard a pin drop as I spoke for about 4 minutes in conclusion on what we were doing in space, and how the decisions we are making today will affect their lives perhaps more than any other in the next two decades. Let us proceed.

I want to welcome General Graham, you are no stranger to this committee. We are delighted that you have taken time to provide us with perhaps a different perspective of where America should be going in its space program, both civilian and military.

You are a recognized authority and your opinions carry great weight here in the Congress of the United States.

We will first hear, however, from Mr. Donald Day, Senior Associate Director, General Accounting Office, and we are also joined by Dr. John Rather, president of Pan-Scion Research. Gentlemen.

STATEMENT OF DONALD E. DAY, SENIOR ASSOCIATE DIRECTOR, GENERAL ACCOUNTING OFFICE, ACCOMPANIED BY BERNARD EASTON, GROUP DIRECTOR, HAROLD W. FULK, EVALUATOR, GAO

Mr. DAY. Thank you, Mr. Chairman. Let me take the opportunity to introduce two of my colleagues. On my immediate left is Mr. Harold Fulk who is the evaluator in charge of this assignment that I am about to describe in my statement. To his left is Mr. Bernard Easton who is our group director in charge of managing assignments in the nuclear weapons area and high technology programs such as the space-based lasers.

We are pleased to be here today to provide an unclassified overview of our classified report to the Congress on "DOD's Space-Based Laser Program—Potential, Progress, and Problems." Copies of the unclassified digest are available here this afternoon.

SPACE LASERS

Space lasers are one of several laser concepts that may some day serve as useful military weapons. However, none of these other laser concepts as presently conceived offer the potential for missile defense that space lasers do. The attainment of the space-laser potential does not appear likely until well into the future.

Due to the early nature of the technology, a diversity of opinion exists in the scientific, industrial, and defense communities regarding whether current laser and related technologies can support a constellation of space-laser weapons for air and missile defense that would be effective and affordable.

Our judgment is that it is premature to believe that the effectiveness and affordability issues can be resolved before important technical uncertainties are favorably resolved. Resolving these uncertainties is necessary before even a limited first-generation weapon system is possible.

We believe resolving these technical uncertainties in an efficient manner is important because of the many significant potential advantages of space-laser weapons. Our review of the existing space laser program and management structure indicates that some measures need to be taken to insure that the current program is structured to resolve uncertainties in an efficient manner. Specifically:

The present program is a funding-limited approach to developing the technology for space lasers. This approach risks keeping the potentially revolutionary technology in component development for the foreseeable future.

Future prospects to augment the present program above that recommended by the Defense Science Board appear bleak. As a result, all space laser feasibility issues will not be fully addressed before a demonstration decision.

Funding limitations have caused performance reductions and schedule slippages in DARPA's space Triad programs. These delays will have implications later since future efforts require data from these programs.

Recent defense studies agree that an on-orbit feasibility demonstration is a necessary step toward pace-laser weapon development. Such a demonstration would provide knowledge relating to weapon system integration. However, the studies do not agree on the timing for such a demonstration. As a result, the pace of the space laser program is an issue that needs to be addressed at this time.

I would like to reemphasize that with such long-range military potential it is important that the space laser program be a well-structured, funded, and managed effort from the outset. We question whether such a program currently exists.

We have recommended to the Secretary of Defense that he establish a DOD space laser program plan containing clear and specific milestones and objectives which recognize the relative priority of space lasers within Defense.

We also recommended that he commit the necessary funds to meet these objectives and to maintain stability of the program selected.

Finally, we recommended that he establish a management structure to accomplish program objectives efficiently.

That concludes my statement.

[The report by the Comptroller General follows:]

REPORT BY THE COMPTROLLER GENERAL OF THE UNITED STATES

DOD'S SPACE-BASED LASER PROGRAM—POTENTIAL, PROGRESS, AND PROBLEMS

The United States is pursuing directed-energy weapon technologies involving devices for generating and controlling laser, particle, and microwave beams which may revolutionize military strategy, tactics, and doctrine. Beam weapons could rapidly destroy targets by means of intense electromagnetic radiation or particle fluxes, instead of by projectiles and explosives. They are expected to play an increasingly defense role in the future.

Laser weapon technology is the best understood and most mature of the three types of directed-energy weapon technologies. The Department of Defense (DOD) has been developing technology to demonstrate the feasibility of high-energy laser weapon systems for various tactical and strategic missions. One widely discussed laser weapon concept involves a constellation of laser weapon platforms in space which has the potential to provide a credible air and ballistic missile defense system for the United States (no such defense currently exists).

WHY THE REVIEW WAS MADE

Since no other laser weapon concept currently being developed has such profound military implications, this report is devoted to the DOD space-based laser (SBL) program. GAO's review of the program was undertaken because of the recent interest in the area by the Congress, DOD, and the media. The review assessed program progress, examined the issues associated with demonstrating SBL weapons potential, and assessed the existing SBL management structure.

FEASIBILITY OF SBL WEAPONS UNCERTAIN

While effective SBL missile defense systems could not be deployed until well into the future, emerging technology has progressed to the point at which its military use is relatively clear. However, significant technical uncertainties remain to be resolved before even a limited first-generation weapon system is possible. The uncertainties relate to all aspects of the system, including the laser device; beam control; acquisition, tracking, and pointing; surveillance; command, control, and communications; and launch and on-orbit servicing. Because of the early nature of the technology, a diversity of opinion exists in the scientific, industrial, and defense communities regarding whether current laser and related technologies can support a constellation of SLB weapons for air and missile defense that would be effective and affordable.

The pace for resolving the uncertainties has been discussed in recent DOD studies of program options. GAO's report discusses the pace of the current SBL program and two of DOD's options to accelerate the pace of the program. These accelerated options considered most prudent by experts move the technology development effort at a pace constrained by technology rather than funding limitations as is now the case. One option includes an early commitment to an on-orbit demonstration to obtain knowledge relating to system integration. The report also discusses the advantages and disadvantages of such an on-orbit demonstration. (See pp. 12 to 19.)

LIMITATIONS OF THE EXISTING SBL PROGRAM

The Defense Advanced Research Projects Agency (DARPA) within the Office of the Secretary of Defense is presently responsible for demonstrating the three major components of an SBL system—the laser, the large optics, and the extremely accurate acquisition, tracking, and pointing system. These components referred to as Alpha, large optics demonstration experiment, and Talon Gold, respectively, are collectively called the DARPA Space Triad. During 1981, the Air Force established a program office for SBL efforts. (See pp. 5 and 6.)

GAO's review highlighted the following situations in the existing program and management structure:

The present program is a funding-limited approach to developing the technology for SBLs. This approach risks keeping the potentially revolutionary technology in component development for the foreseeable future. (See p. 13.)

Future prospects to augment the present program above that recommended by the Defense Science Board appear bleak. As a result, all SBL feasibility issues will not be fully addressed before a demonstration decision. (See p. 22.)

Funding limitations have caused performance reductions and schedule slippages in the Triad programs. These delays will have implications later since future efforts require data from the DARPA programs. (See pp. 23 and 24.)

The SBL program is becoming a joint Air Force and DARPA effort. The Air Force is responsible for SBL weapons development while DARPA is responsible for demonstrating the feasibility of the Space Triad technologies. (See pp. 21 and 22.)

CONCLUSIONS AND RECOMMENDATIONS

Because of the high cost and high military potential, GAO believes that SBLs will continue to attract attention by both the Congress and the Office of the Secretary of Defense, particularly relating to program pace, management, and cost. To illustrate, the DOD Authorization Conference Report directed the Secretary of the Air Force to provide a plan for the management of future high-energy laser weapons programs and a study of the feasibility, cost, schedule, and technological issues associated with SBL weapons. While the Air Force is now responsible for SBL weapons development, including a feasibility demonstration, DARPA continues to be responsible for the Space Laser Triad programs which are designed to demonstrate the technical feasibility of the three major space laser components.

GAO believes that with such long range military potential, it is important that the SBL program be a well structured, funded, and managed effort from the outset. GAO questions whether such a program currently exists.

To address these issues, GAO recommends that the Secretary of Defense:

Establish a DOD SBL program plan containing clear and specific milestones and objectives which recognizes the relative priority of SBLs within DOD,

Commit the necessary funds to meet these objectives and to maintain stability of the program selected, and

Establish a management structure to accomplish program objectives efficiently.

VIEWS OF PROGRAM OFFICIALS

GAO did not request official comments on this report because of the need to issue the report in time for congressional consideration of the fiscal year 1983 defense budget request. GAO did, however, discuss a draft of this report with high level officials associated with management of the program and they agreed with the facts presented. Their views are included as appropriate.

Senator WARNER. Now, General Graham, if we can have the benefit of your views.

STATEMENT OF LT. GEN. DANIEL GRAHAM, USA (RET.), HIGH FRONTIERS, INC.

General GRAHAM. Thank you, Senator Warner. It is a real privilege to be able to address you on this matter. It was also something of a delight to me to hear the kind words that my old colleagues from the Pentagon had to say about the High Frontier concept—although I found it passing strange that the only criticism that was voiced was that our space-borne laser systems might not be in the cards.

I find it passing strange because High Frontier does not in fact rely at all on the development of space-borne laser. In fact, our systems are independent of both nuclear and energy-beam technology.

This is not because we have anything against lasers, as a matter of fact, the High Frontier recommendations include a vigorous continued search for answers in the energy-beam weaponry arena. However, over the course of our study—and I must admit that early on in the study I was sure that the answers would lie in lasers and so forth—that after I had gotten the kinds of technical people aboard that I should have had it became less and less a likely answer, at least for the near term.

So, I agree with GAO, and I agree with my old colleagues in uniform that in all likelihood the answer to space-borne defense does not lie in lasers in the near term but in another kind of weaponry, which is what High Frontier has recommended.

PROJECT HIGH FRONTIER

I am Lt. Gen. Daniel O. Graham, U.S. Army, retired, and I am the director of Project High Frontier. That project is a privately funded effort by more than a score of highly qualified scientists, engineers, strategists, economists, and management experts to develop a feasible alternative to current U.S.-allied strategic concepts, and which have led inevitably to the deadend dilemmas which now plague you gentlemen in Congress, our Nation as a whole, and our allies as well.

We find it most encouraging that this committee is interested in exploring alternatives and we could not agree more fully with Senator Nunn that if it is too costly for us to support current U.S. strategy, it is high time for us to consider changes in our strategic concepts.

Those of us who undertook the High Frontier study, as a public service effort outside the bureaucratic constraints, have recognized all along that Western strategic thinking is set in concrete, that mind-sets formed over the last 2 decades have convinced many—including most of those in this congressional generation—that there is no feasible alternative to a balance of terror with horrendous nuclear casualties if that balance fails to deter. Such thinking leads to never-ending demand for more and more offensive weapons and more and more destructive power at rapidly escalating costs, as we see only too clearly today.

Something has to give. We hope that it will be the concrete mind-sets which blind us to other more feasible and effective ways to keep the Soviet leadership sober and responsible at a cost we can afford even in these difficult times.

As a nation, we fell into the mental rut of ever more offensive and destructive capability to keep the peace because we ignored the technology of defense and its implications for affecting the strategic balance. For example, we assumed 20 years ago—falsely, as it turns out—that defense against a nuclear missile attack is hopeless and technically infeasible.

We forgot that throughout all of history technology advances across the board. At one point it favors the defense, as when the castle walls of Europe were impregnable. At another time it favors the offense, as when gunpowder and cannon broke down those castle walls and changed the entire structure of European society.

In modern times and over the past 20 years, technology of defense has again made great advances. It is indeed possible to hit a bullet with a bullet and kill it today. While we cannot hit and kill all nuclear bullets with our defending bullets, we can hit and kill enough to produce chaos in the offensive planners' minds—and that uncertainty is the essence of deterrence.

This is what deterrence really means—creating crucial uncertainties in the Soviet mind as to what would happen if they launched a missile attack against us and say 20, or 30, or 40 percent of those missles failed to reach their targets. In fact, the High Frontier systems would prevent 95 percent of those missiles reaching their targets.

The High Frontier concepts constitute first and foremost a change of U.S. strategy—from the bankrupt and basically immoral precepts of mutual assured destruction to a stable and morally defensible strategy of assured survival. But High Frontier is not a mere military strategy, it is a true national strategy addressing the legitimate economic and political aspirations of this Nation and those of our allies, as well as our security needs.

The High Frontier study set out to seek technology that would support a new strategy, and not the other way around. Fortunatley, the United States—at least for the moment—has a technological lead over the Soviet Union, especially in space. This advantage has been dramatically demonstrated by the Space Shuttle which gives us the capability of delivering men and material into space to do some of the key things High Frontier is recommending.

NATIONAL SECURITY OPTION

The objective of High Frontier was to formulate a national strategy option that would do these things.

First. Nullify or substantially reduce the growing threat to the United States and its allies posed by the unprecedented Soviet military buildup.

Second. Replace the dangerous doctrine of mutual assured destruction with a strategy of assured survival.

Third. Provide both security and incentive for realizing the enormous industrial and commercial potential of space.

We insisted that this objective be met with recommendations that are militarily sound, technologically feasible, fiscally responsible, and politically practical.

High Frontier is militarily sound because it plays the American long suit of superior technology to restore that margin of safety sought by the President, and it sharply enhances the value of military equipment already in the hands of our forces by protecting that equipment from preemptive strike by the Soviets. Further, it remedies the most egregious flaw of current military doctrine which is the deliberate denial to the Nation of protection from nuclear attack.

The High Frontier concepts are technologically realistic in that all technology recommended for supporting programs is known. High Frontier relies on no scientific breakthroughs, or debatable scientific theories. Engineers, but not scientists, are required to implement the High Frontier.

High Frontier is fiscally responsible by utilizing to the maximum off-the-shelf technology, the high costs of research and development become sunk costs avoidable in future budgets. This approach also permits the avoidance of the high costs of the now "normal" acquisition times of 13 years or so for technological systems. Special management arrangements and "fenced funding" will permit the timeframes for system acquisition which we propose to be met. As a result, the costs become remarkably low.

All High Frontier programs could be initiated now with an $800 million commitment in fiscal year 1983, all of which can be identified in programs in the current budget, not required if High Frontier is pursued.

We have costed each requirement—military and non-military—on a year-by-year basis and conclude that the total cost would be on the order of $24 billion in constant dollars over the next 5 years, $18 billion of which would be military, that is DOD; $6 billion non-military, that is NASA. The total cost over 10 years would be about $50 billion. Now, it may be that our costs are too low, but if our cost estimates are a hundred-percent too low, we nonetheless offer to the Nation a tremendous strategic bargain.

And High Frontier is politically practicable. For one thing, it would not add a single nuclear warhead to the U.S. inventory and cannot be effectively countered by the Soviets by adding more offensive nuclear systems to their inventory.

Further, High Frontier can deliver this generation of Americans from the onus of passing on to our progeny the sorry legacy of the perpetual balance-of-terror which is the core of the mutual assured destruction doctrine. And High Frontier opens up space for industrialization where the potentials are so great they can confound the prophets of doom, renewing confidence and hope in the entire Free World.

In essence, High Frontier harnesses together the two horses of military uses of space and space industrialization to create the equivalent of the British merchantmen and the men-of-war that produced a century of Pax Britannica. British civil and military seapower during Pax Britannica depended upon a common core of superior naval technology. U.S. civil and military space power will rest also on a common core of superior technology—that is space technology. Thus, both the civil and the military side must proceed together.

It should be remembered that British seapower first burgeoned to meet the threat of the Spanish Armada, but later it was the merchant fleet that become the mainstay of British strategic power. That merchant fleet so enhanced the economic well-being of Britain that it paid for the men-of-war many times over. Today we are driven into space to offset the Soviet drive to establish their military domination of these new "high seas," but over the longer term space industrialization will carry the greater strategic impact.

HIGH FRONTIER IS A LAYERED DEFENSE

On the military side, the key proposal of High Frontier is a layered defense: Two layers in space and one ground based. The first space-borne system consists of orbiting satellites armed with non-nuclear space projectiles capable of attacking Soviet strategic missiles in the first few vulnerable minutes of their trajectories.

The second space-borne system is designed to intercept in mid-course those reentry vehicles which penetrate the first layer. This will probably be much the same as the first layer system with an improved suite of sensors. However, it might incorporate laser or other beam weaponry if such technology is sufficiently developed over the next few years.

These two systems combined can reduce the number of Soviet strategic missile warheads reaching their targets by 95 percent or more. If they could be deployed fast enough, we would not even require the third layer, which is the ground-based layer.

A ground-based point defense system is required, however, to close the window of vulnerability before the space systems are deployed. But this system should be cheap and simple with a very narrow, straightforward mission, and that mission should be to destroy for a few years only the confidence of the Soviets in a first strike against the U.S. missile silos and nothing more. If the function of ground-based systems is thus confined, there are a number of quick and inexpensive options available, one of which is proposed by High Frontier.

The primary recommendations on the nonmilitary side of High Frontier are designed to reduce the cost per pound of men and materials in orbit to under $100, and the encouragement of private industrial space enterprises. We propose expansion of the current Shuttle program and the development of a system with much higher payloads and fully recoverable boosters. Several major aerospace companies are prepared to accomplish this, using known technology.

As the cost per pound in orbit is decreased, it is quite apparent that space industry will burgeon. Already, the space communications business is a $500 million per year enterprise and will be a multibillion dollar enterprise by 1990, perhaps exceeding in total revenue the U.S. automobile industry.

These are the essentials of the new national strategy proposed by High Frontier. We are not speaking of futuristic "Star Wars" technology. We are proposing sound solutions to real problems.

Senator, I am prepared to answer any questions you may have concerning the High Frontier concept. Thank you.

[The High Frontier study by General Graham follows:]

Ballistic Missile Defense—Military Benefits, Economic Benefits

THE HIGH FRONTIER STUDY

(By Lt. Gen. Daniel O. Graham (USA Ret.))

FOREWORD

In the early years of the nuclear era, because the United States held a decisive superiority in nuclear weapons and delivery systems, we could rely on massive assured retaliation to deter nuclear attack by ICBM's. Since no means existed then to destroy ICBM's after they were launched, deterrence by threatening massive retaliation was the only viable policy option open to the United States.

The USSR's response was to build a large ICBM force of its own. The United States did not continue to stockpile, hoping that, through SALT, detente, and diplomacy, the USSR could be persuaded to halt their developments at "parity," and that a viable "balance of terror," known as Mutual Assured Destruction (or MAD), could be thereafter maintained.

Unfortunately, the USSR, did not stop at parity. They have surpassed our strategic capability by a substantial margin with no evidence that they intend to abate current high production rates. The high accuracies they have demonstrated with their ICBM's and the ever larger inventory of weapons they are creating constitute an ability to undertake decisive military action against the United States, at any time they should choose to do so. The most important military imperative of this decade is to counter this Soviet capability.

The United States now has the technological capability to destroy Soviet reentry vehicles (RV's) before they reach intended U.S. targets, an option superior to trying to catch up with Soviet proliferation of nuclear weapons. We can design point defenses capable of keeping RV's out of critical range of our hardened Minuteman silos, and space-based platforms with simple interceptors capable of killing ICBM's during boost. The latter, with improved sensors, could also be used against RV's in midcourse trajectory.

Ultimately, we could create a three-tiered defense which: (1) attacks Soviet ICBM's while they are in boost phase, (2) during mid-flight continues attacking the leakage that gets through the boost-phase defenses, and (3) culminates with point defense (around Minuteman silos). Such defense would pose a formidable barrier to any Soviet consideraton of a surprise nuclear strike, furnishing good protection (assured survival) of our cities and industries and excellent protection (3-layer) of our Minuteman sites.

The following pages outline some of the possible consequences of the United States pursuing "assured survival" through missile defense. Comparison will also be provided with building new systems such as MX.

The study concludes that reduction of the military risks we face is mandatory, making the funding of ballistic missile defenses a true imperative. Such funding is clearly of higher priority than funding any other kind of incremental increase in military capability.

U.S. RESPONSE TO U.S.S.R. STRIKE

Our principal alternatives in reacting to a Soviet first strike range from choosing to passively accept such a strike (absorb the consequences), to launch on warning, or to actively defend against the aggression. In this study, defense will be delineated as point defense, boost-phase defense, or mid-course defense. For example:

Point defense.—Point defense herein means very close-in defense of Minuteman silos only. Radar would be employed to launch and point the RV kill mechanism (intelligently guided rocket-powered interceptors, "swarms" of small projectiles or flechettes, or possibly high-fire-rate guns). Since these have nonnuclear kill mechanisms, they could be autonomous (would fire automatically at any very high-speed object coming in on a proper course). Since kills could occur at ranges as close as 3,000 to 4,000 feet, decoys would not be a problem because they would have burned or been screened out during reentry.

Boost phase defense.—This would consist of spacebased platforms, each with 30 to 150 guided interceptors. These platforms would be continuously circling the Earth in orbits that would place them over the desired Soviet target areas for only a fraction of each orbit, requiring, therefore, between 200 and 500 platforms. This would insure that at least 1,000 interceptors would be able to attack Soviet boosters. Boost phase interceptors would use readily available IR sensors to home in on the heat of the ICBM's propulsion units.

Midcourse defense.—Since the space-based system above would have thousands of extra interceptors within useful range while the RV's are in midcourse transit, these interceptors would be available to kill RV's that elude the boost phase interdiction effort. Midcourse intercept, however, would require the development of improved sensors that will discriminate small, cool RV's from decoys and provide intercept guidance. Such sensors have been tested.

U.S. response to U.S.S.R. strike

Absorb strike.

Launch on warning.

Defend: Point defense (hard sites); boost phase interdiction; and midcourse interdiction.

ABSORB U.S.S.R. 1ST STRIKE

If an international situation should develop which, in the Soviet view, would justify a surprise attack against our missile silos, what would be the consequences for the United States, if we choose not to have missile defenses in the future?

Assuming an 80-percent net kill probability against Minuteman, the Soviets need target only two RV's per Minuteman silo to achieve a 96-percent annihilation of our Minuteman force. In numbers, only about 40 of our 1000+ Minuteman force would survive.

A parallel attack on, say, 1,000 other targets of military value would result in only 1 percent, or 10, of these surviving. These targets, being soft, would suffer a 90-percent or greater probability of kill per shot.

Absorb U.S.S.R. 1st strike

U.S.S.R. expenditure: 2 RV's per target; Targets: 1,000 Minuteman, 1,000 other military; 80-percent kill probability—Minuteman; 90-percent kill probability—soft targets.

Surviving U.S. targets: 40 Minuteman, and 10 other military targets.

LAUNCH ON WARNING

If the Soviets view this option as a credible U.S. policy, it could be a strong psychological deterrent, buying us valuable time to build a ballistic missile defense. However, it is not a good policy. If we succeed in launching on warning (i.e., succeed in obtaining launch authority from all levels in a very short time—even if Soviet ICBM launch is not positively verified), then there will be a massive exchange leading to the assured destruction of much of the United States. Otherwise, we absorb a unilateral first strike as discussed on the previous page.

In either event, the effectiveness of almost all of our land-based military resources would be nullified by the incoming Soviet attack.

Launch on warning

If successful: massive nuclear exchange.

If failure to launch: same as case 1.

GROUND-BASED POINT DEFENSE

Using existing technology and off-the-shelf components, point defense of, say, 20 percent of Minuteman could be implemented rapidly. If such systems employed simple swarms of small rockets or flechettes, the kill probability of these systems might be as low as 0.4. Nonetheless, with this limited deployment and low effectiveness, the survivability of Minuteman would be more than double the previous case (86 versus only 40 surviving). If more effective point defense systems are implemented (multiple-shot systems with high-kill probabilities), Minuteman survivability exceeding 70 percent can be postulated against Soviet attack.

These defenses could also be adapted to enhance the survivability of MX in a silo or deceptively based deployment mode. Point defenses would also be an effective counter to cruise missile system threats to ICBM's. They could also defend other hardened targets, such as our national command posts, vital to the country's ability to continue battle.

GROUND BASED POINT DEFENSE—MINUTEMAN SURVIVING

	Percent M² protected	
	20	100
Defense kill (.40)	86	270
Probability (.80)	174	706

Other hardened targets: 10.

BOOST PHASE INTERDICTION

The next chart (first of a set of three charts) illustrates the value of a possible space-based missile defense system. Even if such systems exhibited kill probabilities of only 50 percent, this alone would assure survivability of over one-third of Minuteman. The chart also shows Minuteman survivability when protected by a defense with a somewhat more optimistic 0.85 kill effectiveness.

Since a Soviet ICBM attack most likely would be coordinated with ground forces moving toward preselected objectives, the survivability of U.S. soft targets may be fully as important as having our missile retaliatory forces survive.

The effectiveness of in-depth defense is estimated in the second chart. With midcourse interceptors taking a toll of any RV's escaping the first defensive line, Minuteman survivability jumps to over 90 percent with effective system design.

The third chart depicts a triple-layered defense, including boost, midcourse, and terminal or point defense (for Minuteman only). The cumulative effectiveness of such defense should totally deter nuclear attack via ICBM, either surprise or as the consequence of escalation to theater-level or higher warfare.

BOOST PHASE INTERDICTION

	Surviving minuteman	Other military targets
$P_{kill}=0.5$	360	302
$P_{kill}=0.85$	774	748

BOOST PHASE PLUS MIDCOURSE INTERDICTION

	Surviving minuteman	Other military targets
$P_K=0.5$ [1]	640	600
$P_K=0.85$ [1]	964	960

[1] Boost phase and midcourse interdiction; each have P_K shown.

POINT DEFENSE PLUS SPACE DEFENSE

	Surviving minuteman	Other military targets
Low $P_K=0.5$ [1]	774	600
High $P_K=0.85$ [1]	993	960

[1] Boost, midcourse and terminal; each have P_K shown.

EXPAND MINUTEMAN (MX–MPS)

Expansion of our missile force is an alternative to defense. The MX, with multiple hidden basing sites, is an example of one such possibility. One application previously considered, but rejected, proposed that 200 MX missiles be deceptively deployed within a complex of 4,600 shelters which could serve as possible launching positions. This system would require the Soviets to launch 9,200 RV's to ensure putting two on each MX shelter, a much more costly option for the Soviets than attacking the older Minuteman complexes. However, the MX shelter is not as hard as a Minuteman silo, so a higher single shot kill probability of, say, 0.85 can be assumed.

With two Soviet RV's targeted per MX launch point, only 5 of the 200 MX would survive. Thus, a $50B MX–MPS investment would result in U.S. postattack retaliatory capability only rising from 40 Minuteman to 40 Minuteman plus 5 MX missiles.

Expand M^2 *(MX-MPS)*

200 MX.
4,600 MX shelters.
9,200 U.S.S.R. RV's committed.

Surviving missiles:

Minuteman	40
MX	5
Total	45

U.S.S.R. RV'S ABSORBED BY THE UNITED STATES

This chart compares our alternatives in terms of nuclear detonations suffered as a consequence of a surprise Soviet attack.

The MX plus existing Minuteman alternative invites a Soviet attack of 12,600 RV's, none of which would be prevented from reaching their target regions. If we assume that the functional reliability of Soviet missiles is 0.95, then 11,970 nuclear detonations would result in the United States.

With high kill probability point defense of Minuteman and a 4,000-RV attack (two per target) it is calculated that only 2,280 detonations would occur if salvage fusing [1] of the Soviet RV's is not incorporated. However, if salvage fusing is possible, which is unlikely, the number of detonations could be 3,800.

With addition of space-based defense, the U.S. acceptance of nuclear detonations drops to fewer than 100 for the best cases shown.

In the event that we have poor defenses (low-kill probabilities), a higher attack level similar to that postulated for MX would be credible and the number of detonations in the United States would scale upward accordingly. However, effective layered defense systems, shown in the two right-hand columns, allow so little leakage (less than 3 percent) that scaling the attack size upward is not a credible Soviet attack option.

U.S.S.R. RV's ABSORBED BY UNITED STATES—MILITARY TARGETS

	MX–MPS (200 MX)	100 percent point defense	Boost phase defense	Boost and midcourse defense	3-tier defense
Case	1	2	3	4	5
Attack RV's	12,600	4,000	4,000	4,000	4,000
Bursts:					
Low P_K	11,970	3,040	1,900	950	742
High P_K	([1])	2,280	570	86	52

[1] No defense.

SURVIVABILITY—ALL MILITARY TARGETS

Space-based defense enhances survivability of both our retaliatory nuclear and our conventional military forces. The military value of the survivability of these combined forces is incalculably high.

First, the likelihood that the majority of both our missile and conventional forces would survive a Soviet surprise nuclear attack should preclude any Soviet attempt to initiate such an attack. Therefore, these defenses constitute positive deterrence to possible Soviet opportunism—a deterrence that would not be based on western intellectual assumptions concerning the unacceptability of nuclear warfare to the Soviet Politburo or military leaders.

Second, in the event that limited or wide-scale nuclear war does ensue, we will have maximum chances of using our conventional military forces during and after such exchanges. Since nuclear warfare is the worst possible deterioration of military confrontation, it would only be undertaken if an extremely valuable objective were to be gained. Therefore, it is presumed that the exchange must be followed by conventional forces moving to capture the desired objectives. Consequently, the retention of maximum conventional military capabilities after nuclear attack is an imperative of the highest order for the United States.

The existence of strong U.S. defenses creates an element of uncertainty in Soviet strategic planning. The military value of such uncertainty could be pivotal, precluding the Soviets from considering many options that they might otherwise find to their advantage.

None of the above addresses the possibility of accidental or irrational or third country or terrorist attack on one or more of our cities. Today we have no defense; a space-based system would greatly reduce such a threat.

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[1] The RV would detonate if hit by a defense system.

SURVIVABILITY—ALL MILITARY TARGETS

	Units Existing (1981)	Surviving units (high $P_{K's}$)				
		MX—MPS (200 MX) (no defense)	100 percent point defense	Boost phase defense	Boost and mid-course defense	3-tier defense
Case	Reference	1	2	3	4	5
ICBM's	1,000	45	706	774	964	993
Air bases	140	1	1	105	134	134
Army bases	60	1	1	45	58	58
Naval bases	70	1	1	52	67	67
Overseas bases	140	1	1	105	134	134
Other (nuclear, fuel)	590	6	6	441	567	567
Total	2,000	55	716	1,522	1,924	1,953

DOD EXPENDITURES AT RISK

To put assured survivability in an economic context, consider how much the U.S. has spent on defense over the past decade. To equip and maintain an Army with three-quarters of a million trained men has cost the United States a quarter trillion (current) dollars over the last decade. Our Navy's 500+ ships with all their associated men and equipment has cost a little more—about one-third trillion dollars. These Services, plus an Air Force with 130 squadrons at similar cost, caused nearly $900 billion to be expended by DOD during the 1970's. However, if the Soviets elect to initiate a nuclear strike, this past investment on our part would be largely nullified. With the ability to destroy 99 percent of all bases they target, the Soviets could summarily destroy the majority of our facilities including their corps of trained men.

In simple terms, if we choose not to buy ballistic missile defense (BMD) costing $30 to $50B, the hundreds of billions that we have already spent to secure this broad spectrum of defense forces could be wasted, if the Soviets take military action against us.

As Reagan's defense budget is implemented, the amount of DOD spending at risk will rise to greater heights. For example, about $2½ trillion in total DOD expenditures is contemplated in the 1980's. Is it conceivable that the United States would not expend $30 to $50B (from this $2500B amount) to protect all the defenses to be purchased with the remainder of this $2500B?

DOD expenditures

[Current dollars in billions]

Army:	
Divisions	16
Trained men	758,000
U.S. bases	60
Cost (1970's)	$255
Cost (1980's)	$645
Air Force:	
Squadrons	130
Trained men	559,000
U.S. bases	140
Cost (1970's)	$292
Cost (1980's)	$739
Navy:	
Ships	531
Trained men	686,000
Bases	70
Cost (1970's)	$323
Cost (1980's)	$817
Total DOD:	
Services	$870
Other	$124
Cost (1970's)	$994
Cost (1980's)	$2,515

U.S. LOSSES AT REPLACEMENT COST

This chart compares U.S. options if we consider only the replacement cost of the facilities and equipment at risk in the event of a Soviet strike.

The first column is a rough estimate of the value of all the targeted facilities plus equipment, such as planes or ships, (priced at replacement cost of $725B in 1982). If the U.S. builds MX-MPS only, the total investment lost (column two) to a successful Soviet strike would be $764, which includes the value of MX investment lost.

For all the following defense cases, only high kill capability systems are considered.

Point defense alone (100 percent coverage of Minuteman with a P_K of 0.8) reduces to about one-third the cost of Minuteman lost, but point defense suitable only for hard sites will not protect soft targets from postulated huge losses.

With space-based defense the large DOD investments in bases and other targets can be protected, particularly if both boost and mid-course interdiction are implemented. Facility and equipment losses decline to under 5 percent in this case.

In the final case, three tiers of defense for Minuteman, Minuteman dollar losses are cut to under half a billion. However, it is not cost effective to spend $10B to trim Minuteman loss only about $2B. This would be true if point defense were added after the space defenses were in place, but in actuality, point defense should be deployed first as it can be implemented far more rapidly than the more effective space systems. This is essential if we are to reduce our acute near-term vulnerability.

U.S. LOSSES OF REPLACEMENT COST—MILITARY TARGETS

[1982 dollars in billions]

	Facilities value (replacement cost)	Cost of facilities lost				
		MX-MPS (200 MX) (no defense)	100 percent point defense	Boost phase defense	Boost and midcourse defense	3-tier defense
Case	Reference	1	2	3	4	5
Minuteman	$55	$102	$16	$12	$2	$0
Air bases	240	238	238	60	10	10
Army bases	70	69	69	18	3	3
Naval bases	150	148	148	38	7	7
Overseas bases	40	40	40	10	2	2
Other (nuclear, fuel, etc.)	170	167	167	43	7	7
Totals	725	764	678	181	31	29
Defense cost		50	10	25	30	30–50

CONCLUSIONS

The Soviet Union has a nuclear strategic capability and an on-going production capacity (with no cut-off in sight) which permits them in this decade to threaten or to destroy the majority of our land-based retaliatory and conventional military forces. Our vulnerability will be particularly acute by the mid-1980's.

If we choose not to implement ballistic missile defenses, virtually all of the existing defense systems as well as those to be acquired by the enhancement programs of the current administration will depend totally on the effectiveness of deterrence through Mutually Assured Destruction, a doctrine of doom.

Defense sufficient to enhance Minuteman survivability by several factors can be purchased for considerably less than buying equal capability through expansion of our missile forces. Point defense of Minuteman can also be implemented quickly if procured by expedited procedures and effectiveness requirements are set by current technology.

Effective defense for all military targets (as well as U.S. cities and civil targets) can be acquired through space-based systems of moderate cost. These systems are the only means known, short of pacing Soviet missile proliferation, for denying the Soviets unilateral first-strike capability.

The seriousness of our vulerability dictates that the U.S. act. Immediate implementation of defenses based on available technology is an imperative without peer. Virtually all planned DOD expenditures are subject to the given threat; consequently, nothing can be considered more important than expenditure to counter that threat.

THE HIGH FRONTIER STUDY: A SUMMARY

The United States is faced with an historic, but fleeting, opportunity to take its destiny into its own hands. The ominous military and economic trends which today beset the peoples of the Free World can be reversed, and confidence in the future of free political and economic systems can be restored.

To accomplish this, we need only take maximum advantage of one priceless legacy handed down to us by those free institutions—superiority in space technology. We can escape the brooding menace of "balance of terror" doctrines by deploying defensive systems in space. We can confound the prophets of doom by opening the vast and rich High Frontier of space for industrialization.

If we are to seize this historic opportunity, we must first muster the political will to discard without qualm the failed doctrines of the past, to attack without quarter the bureaucratic impediments to action, and to meet without flinching the wave of indignation from outraged ideologues at home and abroad. The technology is available, the costs are reasonable, and the alternatives are not promising solutions to our security problems.

THE OBJECTIVE

The objective of the High Frontier Study is to formulate a national strategy option which would make maximum use of U.S. space technology to accomplish the following goals:

- Nullify the present and growing threat to the U.S. and its allies which is posed by Soviet military power.
- Replace the dangerous doctrine of Mutual Assured Destruction (MAD) with a strategy of Assured Survival.
- Provide both security and incentive for realizing the enormous industrial and commercial potential of space.

GUIDELINES

This objective must be met with recommendations that are:

- Militarily sound.
- Technologically feasible.
- Fiscally responsible.
- Politically practical.

THE THREAT IMPERATIVE

The High Frontier effort has focused primarily on countering the Soviet military threat which is ominous and growing. This threat is the result of determined efforts by the Soviet Union to establish global military dominance—efforts that have been abetted by poorly conceived U.S. security policies such as MAD. The Soviet military buildup coupled with U.S. military neglect has created these alarming conditions:

- There is a serious and growing Soviet advantage in strategic nuclear power which cannot be countered by the undefended United States except by a threat of retaliation that involves national suicide.
- The preponderance of Soviet conventional power vis-a-vis the U.S. and its allies is also severe and growing. It can no longer be counterbalanced, as it has been in the past, by a credible threat to bring higher technology U.S. weaponry to bear.
- The Soviet Union is increasingly successful in the use of propaganda and the application of direct or indirect military power to disrupt our alliances and to force the conversion of underdeveloped nations to Marxism. This

Soviet success now threatens the continuing availability of raw materials which are critical to the industrialized West.

- The West is dangerously dependent on diminishing crude oil supplies located in areas threatened by Soviet military or manipulative political power.
- The U.S. alliance system is in serious disarray. It suffers a lost sense of purpose and a perception of a decline in U.S. power and leadership. The Soviet propaganda offensive against U.S. nuclear weapons designed to persuade Europeans to become neutral is increasingly effective.

The Soviets are engaged in a costly and all too successful effort to cap their current strategic advantages—in their terms "a favorable correlation of forces"—with Soviet domination of near Earth space. The Soviets have the only tested space weapon on either side, an antisatellite system. They have orbited nuclear reactors. They have a manned space station in orbit and are expanding it. Almost all Soviet space activity has a distinct military flavor. The essence of the Soviet military space threat was included in the 1981 Department of Defense publication *Soviet Military Power* (pages 79-80):

> "The Soviets have a vigorous and constantly expanding military space program. In the past ten years they have been launching spacecraft at over 75 per year, at the rate of four-to-five times that of the United States. The annual payload weight placed into orbit by the Soviets is even more impressive—660,000 pounds—ten times that of the United States. Some, but by no means all, of this differential can be accounted for by long-life U.S. satellites using miniaturized high technology components. Such an activity rate is expensive to underwrite, yet the Soviets are willing to expend resources on space hardware at an approximate eight percent per year growth rate in constant dollars.
>
> "We estimate that 70 percent of Soviet space systems serve a purely military role, another 15 percent serve dual military/civil roles, and the remaining 15 percent are purely civil. The Soviet military satellites perform a wide variety of reconnaissance and collection missions. Military R&D experiments are performed onboard Soviet manned space stations, and the Soviets continue to develop and test an ASAT antisatellite co-orbital interceptor.
>
> "The Soviets appear to be interested in and possibly developing an improved ASAT. A very large space booster similar in performance to the Apollo program's Saturn V is under development and will have the capability to launch very heavy payloads into orbit, including even larger and more capable laser weapons. This booster is estimated to have six-to-seven times the launch weight capability of the Space Shuttle.
>
> "Soviet space research and development, test, production, and launch facilities are undergoing a continuing buildup. The new booster will be capable of putting very large permanently manned space stations into orbit. The Soviet goal of having continously manned space stations may support both defensive and offensive weapons in space with man in the space station for target selection, repairs and adjustments and positive command and control. The Soviet's predominantly military space program is expected to continue to produce steady gains in reliability, sophistication and operational capability."

The Soviets consider space a perfect environment in which to exercise their long standing doctrinal and operational preferences in warfighting—unconventional "first moves," preemptive attacks or "decapitation attacks" against vital targets such as strategic communications, "combined-arms" moves (as are possible with shiptracking satellites), and other elements of their well stocked repertoire. The Soviets integrate military space operations into their strategic thinking. They see space in straightforward terms, as an operational or combatant theater, whereas we see it—given our own strategic culture—as a "sanctuary" where "support forces" for terrestrial military forces can operate permissively.

If Moscow achieves its aims, we will be faced with a new era of *Pax Sovietica* in which Soviet space power dictates Free World behavior. We believe that the High Frontier of space provides us with the opportunity, perhaps our only opportunity, to frustrate Soviet power ambitions and at the same time open up a new era of hope and prosperity for the U.S. and the Free World.

THE HISTORICAL IMPERATIVE

The immediate threat impels us to exploit our space technology, but there is also an unavoidable historical imperative to move vigorously into that arena. Throughout man's history, those nations which moved most effectively from one arena of human activity to the next have reaped enormous strategic advantages. For instance, when man's activities moved from the land to the coastal seas, the Vikings established an extraordinary dominance by excelling at sailing those seas.

After the epic voyages of Columbus and Magellan, Spain and Portugal dominated the world through military and commercial control of the new arena of human activity—the high seas. Later England with her powerful fleet of merchantmen and men-of-war established a century of Pax Britannica. When the coastal seas of space—the air—became a new sphere of human activity, the United States gained great strategic advantages by acquiring the most effective military and civilian capability in aviation. Today, after epic manned and unmanned exploration of space, we shall see which nation puts the equivalent of the British merchantmen and men-of-war into space. We dare not let it be our adversary.

THE MILITARY DIMENSION

We cannot reverse the ominous trends in the military balance if we adhere to current strategy and try to compete with the Soviets in piling up weapons of current technology. Even if Congress were willing to appropriate unlimited funds for procurement of these weapons (and it is not), our defense production base is in such a sorry state that it could not compete with the Soviet arms production base which is today operating at very high levels. Our best hope is to change our strategy and to move the key competition into a technological arena where we have the advantage.

A bold and rapid entry into space, if announced and initiated now, would end-run the Soviets in the eyes of the world and move the contest into a new arena where we could exploit the technological advantages we hold. This is far preferable to pursuing a numbers contest here on Earth, which will be difficult if not impossible for us to win.

THE STRATEGIC DEFENSE OPTION

When we look to space for the technological end-run of the Soviets, we find all factors call for an emphasis on strategic defense. *First,* defensive systems hold the only promise to break out of the Mutual Assured Destruction doctrine. *Second,* defense is the only sound alternative to costly "racetrack"-type options to protect our deterrent systems. *Third,* our current and crucial heavy military investment in space is also vulnerable to attack. *Fourth,* available technology favors defensive space systems. *Last*, there are severe political constraints and some technical-military reasons inhibiting the deployment of offensive weapons in space.

For these reasons the military side of High Frontier emphasizes the resurrection of a long neglected aspect of our security—protective strategic defense. We visualize a layered strategic defense. The first layer would be a spaceborne defense which would effectively filter a Soviet missile attack in the early stages of flight. The second layer would be a broader space protection system, perhaps using advanced beam weaponry to further reduce the effectiveness of a missile attack and to defend other space assets from a variety of attacks. The third layer would be a ground based point defense system capable of removing any Soviet assurance of success of a first strike against our missile silos—even *before* a space system is deployed—and of intercepting Soviet missiles which later might leak through the space defenses. A passive fourth layer would be civil defense, which becomes a valuable aspect of strategy in conjunction with these active defense layers.

We can get a point defense within two or three years which would be adequate to protect our ICBMs in silos and avoid the high cost deployment modes for MX. An initial spaceborne global ballistic missile defense (GBMD) can be acquired in five or six years given adequate priority. A second generation general space defense using more advanced technology can probably be achieved in the early 1990s.

In proposing such strategic defenses, one invariably encounters the shibboleths that have plagued consideration of strategic defensive options in the past. It has been an article of faith in the offense-only, Assured Destruction school of thought that strategic defenses in the nuclear era are useless unless they are impermeable or not subject to attack and/or that they are impossibly expensive. These are false premises.

With regard to impermeable or invulnerable defenses, there never has been nor ever will be a defensive system which could meet such criteria. Such perfectionist demands ignore the purposes of defenses and the effects of strategic defense on deterrence. Defenses throughout military history have been designed to make attack more difficult and more costly—not *impossible*. Defenses have often prevented attack by making its outcome uncertain. General Grant put a cavalry screen in front of his forces not because the cavalry was invulnerable to Confederate bullets or because he thought it could defeat General Lee, but because he did not want the battle to commence with an assault on his main forces or his headquarters.

It is this same military common sense that must prevail in our approach to strategic defenses today. Given the drastic consequences of a failed nuclear attack on an opponent, the critical military task is to keep a potential aggressor *uncertain of success* if not certain of failure. In the absence of defenses the Soviet military planner has a rather straightforward arithmetic problem to solve to be quite sure of the results of a disarming strike against all locatable U.S. strategic weaponry—ICBM sites, airfields, and submarine bases. His problem is simply to insure that he can deliver two warheads of current size and accuracy against each such target. If, on the other hand, the Soviet planner must consider the effects of a strategic defense, especially a spaceborne defense which destroys a portion of the attacking missiles in the early stages of their trajectories, he is faced with a problem full of uncertainties. He does not know how many warheads will arrive in the target area and—even more crucial—which *ones* will arrive over which targets. This changes the simple arithmetic problem into a complex calculus full of uncertainties. *Such uncertainties are the essence of deterrence.*

Strategic defenses are eminently practicable and by no means impossibly expensive if the programs involved are not required to meet unrealistic standards of perfection or incredible postulated threats. A cursory review of combinations of spaceborne defenses, land based ABMs, and civil defense—while by no means *definitive* as to costs—indicates that a defense system of decisive strategic importance can be devised which is relatively inexpensive when compared with some previously proposed offensive systems.

SURVIVABILITY

One issue which must be carefully addressed is that of space system survivability. While space systems are nearly invulnerable to a large array of threats with which terrestrial systems must cope (e.g., bombs and bullets) they have some unique vulnerabilities to threats which can be posed by a technologically advanced adversary. An examination of this problem leads to several conclusions:

- As with all other systems, no space based system can be envisaged which is invulnerable to *all* postulated threats.
- Vulnerability of current U.S. space assets (intelligence and communications satellites and the Shuttle) sharply increases the imperative for an effective spaceborne defensive system which can defend itself, reduce the threat to other space systems, as well as defend ground targets against hostile objects transiting space, e.g. ICBMs.
- Defensive systems employing large numbers of less sophisticated satellites are far less vulnerable than those employing small numbers of more sophisticated satellites.
- An ability to provide mutual warning and protection among satellites in a ballistic missile defense is very important to survivability.
- The sooner a spaceborne ballistic missile defense system can be deployed, the better its survivability (long lead time systems are susceptible to long lead time Soviet countermeasures—real or postulated).
- Future U.S. deployment of more sophisticated beam weapon military satellites may be dependent for survivability on protection provided by a lower technology defensive system already deployed.

Given the characteristics of currently operating U.S. space systems, one can readily postulate ways for the Soviets to attack them, ranging all of the way from throwing sand in their paths to burning them out of space with futuristic beam weapons. Such attack modes fall into two basic categories, peacetime attack and wartime attack.

Most *current* Soviet capabilities to attack U.S. space systems are applicable in the peacetime attack category. These include attack with nonnuclear direct ascent missiles, the current Soviet antisatellite system, and current power level Soviet lasers. However, these attack modes presuppose Soviet willingness to risk the grave consequences (including war) of attacking our space systems in time of peace or crisis. While such Soviet action cannot be totally ignored, most experts on Soviet behavior find this possibility extremely remote.

The second class of threat—wartime—is more serious. In this situation nuclear weapons could be used to destroy or disable our space systems using radiation effects. (Blast effects are of little effect outside the atmosphere.) There are technical means of reducing the vulnerability of space systems to these effects, but a capability of a defensive system to intercept hostile objects directed at it is the best counter to such threats.

The Soviets may develop laser beam weaponry of such power that satellites passing over them could be destroyed with a single burst of energy. It is doubtful, however, that such systems could, in the foreseeable future, successfully attack satellites coming over the horizon toward the Soviet Union where they would be shielded by much more of the Earth's atmosphere.

Probably the most important factors in the survivability problem are military rather than technical. Survivability is sharply increased by the ability of space vehicles to destroy threatening objects launched at them, or at other U.S. space vehicles. Even should the Soviets eventually create the means to attack a spaceborne defense system successfully in order subsequently to launch a strategic missile attack, all chances of destroying the U.S. deterrent on the ground would be lost. In these circumstances, launch on warning or launch under attack become both credible and feasible options for the United States. The Soviets could not expect, after the attack in space, that the U.S. President would hesitate to respond to sensor warnings that a missile attack had been launched from the USSR. This fact alone would make a spaceborne defense of great strategic value.

NONMILITARY DIMENSION

Space holds out the promise of a new era of economic expansion. The unique environment of space—zero gravity, near perfect vacuum, unlimited heat absorption, and sterile conditions—opens up a broad range of industrial/commercial possibilities. Space also contains inexhaustible supplies of minerals and solar energy. The economic potential of space is already being tapped in the communications industry. As the cost of space transportation is lowered, the industrialization of space will burgeon. However, the capital investment in space industries will be quite large and unlikely to be undertaken if space installations are unprotectable from hostile attack. For this reason, military capabilities in space are critical to space based economic growth.

We should harbor no illusions that space can be limited to ''peaceful uses'' any more than could previous arenas on land, sea, or in the air. Indeed, most current space assets, U.S. and Soviet, are partially or entirely military—and the most destructive of all weapons, strategic ballistic missiles, must transit space en route to their targets.

The government's role in opening up the High Frontier of space for economic exploitation is basically the same as it has been with the opening of frontiers of the past: exploration, transportation systems, and security. These functions translate to these specifics: scientific research, improving the Space Shuttle, and providing spaceborne defenses.

Both the military and nonmilitary uses of space depend on the continued efforts in certain core technologies: improvements in space transportation to reduce the cost-per-pound of materials in orbit, and the creation of permanent, manned space stations at the ''terminals'' of the space transport system.

While these efforts are primarily the responsibility of government, they should be undertaken in cooperation with private industry and with support from other nations which would benefit.

With a proper combination of space technologies we can sharply improve the security of the U.S. and its Free World allies, and at the same time restore confidence in the ability of Free World economies to meet the challenges of the future.

The urgency here is far greater than many people in this country appear to recognize. Following the U.S. successful Moon landing the Soviets made it clear that, while intending first and foremost to develop maximum possible military capabilities in space, they expect also to achieve dominance with respect to the economic exploitation of space opportunities. In 1964, Brezhnev spoke of these plans, and Soviet specialized literature has gone into great detail concerning concrete possibilities. Further, all phases of ongoing Soviet space activities that aim at strategic objectives also serve as stepping-stones to the USSR's preeminence in the space environment for military as well as nonmilitary purposes.

THE URGENT REQUIREMENTS

In order to fulfill the objectives of the High Frontier concept, including the rapid closing of the "window of vulnerability," creating the concrete basis for a new strategy of Assured Survival, and opening space for economic growth, the following list of urgent requirements is presented. It should be noted that these requirements, when met, will not solve *all* urgent military problems facing the United States, let alone all economic problems.

The urgent requirements for military systems to implement the High Frontier concept are these:

1. A point defense for U.S. ICBM silos which, within two or three years, at a cost less than that of superhardening, can destroy any confidence the Soviets might have in a first strike against our deterrent.
2. A first generation spaceborne ballistic missile defense, deployable in five or six years at a cost not exceeding that of the original MX-MPS system, and capable of significant attrition of a Soviet strategic missile attack in the early part of trajectory.
3. A second generation space defense system, deployable within 10 or 12 years and capable of attacking hostile objects anywhere in near Earth space with advanced technology weaponry.
4. A utilitarian manned military space control vehicle, deployable within the next six to eight years, and capable of inspection, on-orbit maintenance and space tug missions wherever satellites can go.
5. A civil defense program of sufficient scope and funding to take advantage of the proposed active strategic defenses and thus add to U.S. deterrent strength.

The primary urgent requirements in core space technology and nonmilitary applications are:

1. Improved space transportation, designed to lower the cost-per-pound in orbit to under $100.
2. A manned space station in low Earth orbit as soon as practicable. It would allow low cost, efficient development and testing of both civilian and military system elements, and constitute a first step toward a similar manned station at geosynchronous orbit.
3. Development work on reliable, high capacity energy systems in space, initially to power other space activities, and eventually to provide electrical power to any spot on Earth.
4. Preparatory development of a selected number of promising commercial business opportunities. Government efforts should focus on encouraging the transformation of these "seed" efforts into independently viable commercial operations as soon as possible.

CAN WE DO IT?

All these requirements can be met, some of them with technology already in hand, with components already tested. None of these requirements demand technological "breakthroughs" or a commitment to mere scientific theories. There are in fact a variety of viable options available to meet each of the requirements of High Frontier. The following is a description of one set of programs which could do so. Each is described in some detail in the main body of this study. The costs estimated for these programs are in constant dollars. The costs and times indicated are based on a management system which minimizes bureaucratic delays.

QUICKLY DEPLOYABLE POINT DEFENSE

A partially tested system exists that could meet the requirement to destroy Soviet confidence in a first strike against our silos. It is a very simple system which fires a large number of small conventional projectiles which form a barrier against a warhead approaching a U.S. missile silo at about one mile from the target. It could be described as "dynamic hardening" instead of as an antimissile system. If deployed to intercept only the first Soviet warhead approaching a silo, it would cost $2-3 million per defended silo. If it is to intercept a second warhead, the costs increase to about $5 million per silo.

FIRST GENERATION SPACEBORNE DEFENSE

The requirement for an initial spaceborne ballistic missile defense system can be met by using off-the-shelf hardware to create a multiple vehicle, orbiting system. This system would deploy nonnuclear kill vehicles to destroy Soviet missiles in the early phase of trajectory. Enough weapons carrying satellites would be orbited to ensure continuous coverage of Soviet ballistic missile trajectories, including those of SS-20 Eurostrategic missiles and submarine launched missiles. This system could provide protection to the allies as well as to the United States.

The multiple satellite deployment permits one satellite to defend itself and several others from hostile attack. It also has the potential for forming the basis of a highly effective and secure command, control, and communications (C^3) system. Since the system makes maximum use of off-the-shelf space hardware components, it may be the cheapest and quickest available option. This system could start deployment in perhaps as little as three years and be fully deployed in five or six years at a cost of some $10-15 billion.

SECOND GENERATION SPACEBORNE DEFENSE

The most promising possibility for a second generation spaceborne defense is product improvement of GBMD I. With the addition of advanced infrared sensing devices the first generation can be made capable of attacking individual warheads throughout their trajectory up to reentry into the atmosphere. This system could be ready for deployment in 1990 at a cost of about a $5 billion add-on to GBMD I costs.

The requirement for higher technology space defense systems might also be met by a high powered laser system on the ground with redirecting mirrors on satellites or by beam weapon systems deployed in space or in pop-up installations on the ground. These systems are currently being researched. Costs to continue research should probably be increased by about $100 million per year.

HIGH PERFORMANCE SPACEPLANE

There is an urgent need to develop a multipurpose, military, manned space control vehicle to perform a wide variety of space missions such as inspection of friendly or suspect space objects, satellite and space station protection, and adjustment or retrieval of satellites. One such vehicle is the high performance spaceplane, or one man "space cruiser," which utilizes available space hardware components and technology and which could be operating in several years for less than $500 million in cost. It is now under active consideration in the Department of Defense.

CIVIL DEFENSE

Civil defense is a multifaceted endeavor, the utility and cost effectiveness of which sharply increase when considered in conjunction with active defenses. This study concludes that increased funding for civil defense is required for the near term but that over the longer term the active defenses of High Frontier would reduce the requirement for resource expenditures on civil defense. The impact of these conclusions on priorities and costs of current civil defense programs has not been analyzed in this study.

IMPROVED SPACE TRANSPORTATION

The immediate answer to improved space transportation is an upgrade of the current Shuttle program to improve turnaround time and to create an unmanned cargo-only version. At the same time, development work should begin on a much higher load capacity vehicle. These programs would cost an estimated $6 billion over a 10-year period.

A MANNED LOW EARTH ORBIT SPACE STATION

The currently proposed military Space Operation Center should be given high priority and expanded in concept to include provision for "fly-along" industrial/commercial space installations. The space station should be equipped to receive power for operations from a prototype solar power satellite. A 10-year program to deploy this space station should cost about $12 billion.

A SPACE POWER SYSTEM

This requirement can be met by a proposal using known technology which would place in geosynchronous orbit a solar power satellite and place on Earth a microwave receiving antenna and conversion system providing 500 megawatts of continuous electrical power. This pilot system, modified to include a capability to provide power to a space station with laser transmission, would cost about $13 billion.

SPACE INDUSTRIAL SYSTEMS RESEARCH AND DEVELOPMENT

The costs of R&D for industrial space applications would probably be borne almost entirely by interested private enterprise, with no more than $50 million per year in government support.

COSTS

The total costs of the High Frontier concept over the next five or six years in outlays of constant dollars might be on the order of $24 billion. Through 1990 the total costs in constant dollars would probably be about $40 billion—a figure that compares favorably with what would have been the total cost of MX-MPS in its original configuration. It also compares favorably with the Apollo Moon-landing program, and strikingly so if the inflation rate of the past 12 years is considered.

If one considers possible tradeoffs in programs no longer needed or lowered in priority by the existence of an effective strategic defense, the real costs of the High Frontier programs are even lower. For instance, the billions now earmarked for superhardening of existing missile silos and for deploying more complex point defenses need not be expended. There are other possible tradeoffs such as repositioning of SAC airfields, reducing the urgency of theater nuclear force upgrade in Europe, C^3 improvements, and so forth.

Finally, there is a reasonable chance for sizeable cost offsets from industry and allied participation in the most expensive aspects of the High Frontier effort—nonmilitary applications. This is especially true if a vigorous effort to tap solar energy is emphasized. Several nations have already stated their willingness to assist in such an effort. Such nongovernment support would further reduce the real costs of the concept.

In any case, costs to the U.S. taxpayer of implementing High Frontier will certainly be lower than those involved in other approaches to solving urgent security issues, e.g., MX-MPS. The High Frontier approach, therefore, cannot be characterized as unrealistically expensive.

IMPACTS

The mere announcement of a bold, new U.S. initiative along the lines of the High Frontier concept would have beneficial impacts at home and abroad. The *fulfillment* of the urgent requirements noted above would have even more far reaching impacts.

MILITARY IMPACTS

On the purely military-strategic side, we would be moving away from the unstable world of terror balance to one of Assured Survival—a much more stable condition. We would provide answers to U.S. and allied security problems not involving the amassing of ever larger stockpiles and ever more expensive deployments of nuclear weapons.

By creating a proper balance between strategic offense and strategic defense we broaden the options for strategic retaliatory systems. A great deal of the counterforce, damage-limiting function of our strategic forces can be shouldered by the defensive systems. Cruise missiles become a more attractive option in a new strategic setting that includes defenses against ballistic missile attack.

Perhaps most important to our military efforts as a whole, the High Frontier concept would restore the traditional U.S. military ethic. The military man's role as defender of the country has always been the tie that has bound him to the supporting citizenry. Strategies of the recent past, such as MAD, which deny that role have seriously weakened that bond. A commitment to a new strategy which is consistent with the military rationale of the average U.S. citizen could greatly ease problems in all facets of U.S. security efforts.

POLITICAL IMPACTS

The potential for public support of this concept is enormous. If the military and nonmilitary aspects of High Frontier are effectively harnessed together, broad segments of the U.S. body politic are likely to rally in support. Recent elections have demonstrated the widespread desire for improved defenses. There is a remarkably large support base, primarily among younger people, in the form of space enthusiasts. And there is general public disillusionment with the doctrines and strategies of the past.

The High Frontier concept would even convert or confuse some of the conventional opponents of defense efforts and technological innovations. It is harder to oppose nonnuclear defensive systems than nuclear offensive systems. It is impossible to argue effectively for a perpetual balance of terror if it can be negated by new policies. It is hard to make environmentalist cases against space systems.

Even those naysayers whose basic concern is disarmament will be hard pressed to make a case against High Frontier, the ABM Treaty notwithstanding. It is not necessary to abrogate the ABM Treaty to commit to High Frontier programs.

The High Frontier spaceborne defensive systems fall into the category described in the treaty as "systems based on other principles" which are "subject to discussion" with the Soviets. Point defense systems can be selected which are so different from ABM systems as defined in the treaty, that they too could be considered as outside the treaty. Indeed, some silo defense systems can be considered "dynamic hardening"—a substitute for reinforced concrete—rather than an ABM. Further, the current ABM Treaty is scheduled for review in 1982, and the United States could propose any amendments deemed necessary to accommodate strategic defensive decisions.

A U.S. commitment to the High Frontier concept does not necessitate rejection of arms negotiations with the Soviets. It does, however, mean that future negotiations would proceed on a different philosophical basis. Rather than continue to pursue agreements which attempt to perpetuate a balance of terror and MAD, our negotiating efforts would be dedicated to achieving a stable world of Mutual Assured Survival.

ECONOMIC IMPACTS

There can be little doubt that a strong commitment by the United States would have highly beneficial economic impacts. Some of these impacts will affect the U.S. economy in the near term, primarily through the stimulus to investment in high technology sectors of industry and a probable upswing in confidence generally. An increase of 200,000 jobs in the near term as a result of a strong commitment to space has been estimated. Longer term impacts will depend on the rate at which industrial applications are realized and on unpredictable technological spin-offs from the space effort.

One area of commercial space application is already paying its way very well. Space communications is a $500 million-per-year enterprise and is growing rapidly. By 1990 it should become a multibillion dollar-per-year industry.

As other industrial applications in space are realized, the total revenues from space industries might reach levels of several tens of billion dollars-per-year by the year 2000.

Some of the most beneficial economic impacts of a strong High Frontier effort are indirect and unquantifiable. The demand for highly skilled workers is certain to have an impact on the education system and on the labor market. New products, tools, and services will be required by an expanding space effort. Research efforts will intensify.

Overall, the economic benefits of a strong U.S. commitment to the exploitation of space for both security and industry are potentially very great, but they are no more predictable today than were the future economic benefits of aviation in the 1920s.

FOREIGN IMPACTS

The positive political effects in the U.S. will probably be reflected overseas among our allies. The announcement of a commitment to the High Frontier concepts could have a strong countereffect on the current highly disruptive, "antinuclear," or "peace" movements in Europe. A bold U.S. strategic initiative would certainly bolster the morale of pro-U.S. elements. The High Frontier concept can become a new cement for Free World alliances, making them global rather than regional.

A shared U.S.-Allied commitment to the harnessing of solar power from space could have highly beneficial impacts on foreign relations. If the prospects were good for future supplies of energy independent of the geographical location of fossil fuels, the overdependence of the industrialized West on oil and gas producing countries could be rectified. Further, the prospects for overcoming the intractable problems of the underdeveloped nations could have a beneficial impact on the attitudes of the Third World.

As for the Soviets, their reaction is easily predictable as hostile. They have already moved to counter the U.S. potential to adopt available military space options. They have introduced in the United Nations (and garnered some support for it among our allies) a new treaty which would ban *all* (not just nuclear) weapons in space. Meanwhile, evidence mounts that they are already in violation of their own cynical proposition. We can expect an extraordinarily strong Soviet propaganda effort against a U.S. commitment to the High Frontier concepts, including threats of counteraction. However, in both particulars Moscow will find, for substantive reasons, an attack on the High Frontier concepts much more difficult to conduct than past anti-U.S. campaigns.

MANAGEMENT

Time is critical in any commitment to the High Frontier, especially with regard to the military systems. If we cannot change the adverse trends in the military balance quickly, we may not be able to change them at all. If we do not move quickly to secure space for promising industrial development, we may later be denied the opportunity.

There are no technical obstacles to meeting the military and nonmilitary objectives of High Frontier. We can close the window of vulnerability in two or three years and negate the brooding menace of Mutual Assured Destruction in five or six years. We can lower the costs of men and materials in space, establish a permanent manned presence in space, and open the door to enormous economic advantages in 10 years. However, this can be done only by initially selecting systems using to the maximum off-the-shelf technology and by instituting special management and procedural arrangements for their rapid acquisition and deployment. By using known and tested technology we can avoid the long delays imposed by research and development. By special management arrangements we can avoid the bureaucratic hurdles which have been inserted into our weapons acquisition processes over the past 15 years. Time is money, and literally billions can be saved by cutting acquisition times.

In 1956, President Eisenhower gave the go-ahead on a concept for a ballistic missile firing submarine. That concept involved far more technological unknowns than do the High Frontier options. In 1960, 47 months later, the first Polaris put to sea. In 1962, President Kennedy announced the objective of landing a man on the Moon. Seven years later this astonishing feat was accomplished.

Today, even a new fighter aircraft takes 13 years or more from concept to acquisition, and decades of delay are predicted for space developments. Such protracted processes cause costs to soar astronomically. This sad state of affairs exists not because Americans have become technologically inept but because we have, over the years, constructed a complex and multilayered bureaucratic system in the Executive Branch and in the Congress which simply cannot produce quick results. In order to take advantage of the opportunities available to us on the High Frontier, we must—at least for a few years—find a way to short circuit the bureaucratic institutions and procedures.

The first step is to select—and select quickly—those systems which will meet the urgent requirements of the High Frontier concept. This should be done by a Presidential Systems Selection Task Force composed of prominent and properly qualified individuals.

To provide overall guidance to the High Frontier effort, a National Space Council should be appointed with representation from the involved departments and agencies of the Executive Branch, the Congress, and industry. Its function would be to insure full cooperation and fast action by all branches of government and of private industry involved in the effort. Its chairman should be the Vice President.

The actual coordinating and expediting of the programs selected to meet the High Frontier requirements should be the responsibility of a chief operating officer heading up a Consolidated Program Office. This officer should be assisted by special project officers within the departments and agencies charged with acquiring the first generation of High Frontier systems. The management system should insure individual rather than committee responsibility for decisions, a minimum of Executive and Congressional staff review, and specified or "fenced" funding for High Frontier programs.

This management system should be unequivocally temporary. It should go out of existence upon achievement of its objectives of first generation system acquisition. As results are obtained, all responsibility for the operations, maintenance, and further growth of space systems should return to the cognizance of the appropriate agencies—Defense and NASA. There is no need to create a new permanent layer of bureaucracy.

These are the essentials of the High Frontier concept. They are discussed in much greater detail in the main body of the study. We believe that the change of strategy recommended in this study supports a U.S. policy statement as follows:

PROPOSED STATEMENT OF U.S. POLICY

The United States and its allies now have the combined technological, economic, and moral means to overcome many of the ills that beset our civilization. We need not pass on to our children the horrendous legacy of "Mutual Assured Destruction," a perpetual balance of terror that can but favor those most inclined to use terror to bring down our free societies. We need not succumb to ever gloomier predictions of diminishing energy, raw materials, and food supplies. We need not resign ourselves to a constant retreat of free economic and political systems in the face of totalitarian aggressions. The peoples of the Free World can once again take charge of their destinies, if they but muster the will to do so.

In April of 1981, the Space Shuttle Columbia made its dramatic maiden voyage into space and back safely to Earth. This event was not merely another admirable feat of American space technology. It marked the advent of a new era of human activity on the High Frontier of space. The Space Shuttle is a development even more momentous for the future of mankind than was the completion of the transcontinental railway, the Suez and Panama Canals, or the first flight of the Wright brothers. It can be viewed as a "railroad into space" over which will move the men and materials necessary to open broad new fields of human endeavor in space and to free us from the brooding menace of nuclear attack.

This is an historic opportunity—history is driving us to seize it.

A few thousand years ago, man's activities—his work, his commerce, his communications, all of his activities, including armed conflict—were confined to the land.

Eventually man's technology and daring thrust his activities off the land areas of the continents and into the coastal seas. His work, commerce, communications, and military capabilities moved strongly into this new arena of human activity. Those nations that had either the wit or the luck to establish the strongest military and commercial capabilities in the new arena reaped enormous strategic advantages. For example, the Vikings, although never a very numerous people, became such masters of the coastal seas that their power spread from their homes in Scandinavia over all the coasts of Europe and into the Mediterranean Sea, up to the very gates of Byzantium.

At the beginning of the 16th century, after the epic voyages of men like Magellan and Columbus, human activity surged onto the high seas. Once again, the nations that mastered this new arena of human activity reaped enormous strategic rewards. First Spain and Portugal utilized their sea power to found colonies and to solidify their strength in Europe. Later, Great Britain, with an unsurpassed fleet of merchantmen and fighting ships, established a century of relative peace which we remember as Pax Britannica.

In the lifetime of many of us, man's activity moved strongly into yet another arena, the coastal seas of space—the air. And once again the nations which quickly and effectively made use of this new arena for commerce and defense gained great advantages. As Americans we can take pride that the greatest commercial and military successes in aviation have been achieved by our nation.

But today, following the epic voyages of our astronauts to the Moon and our unmanned explorer satellites to the rings of Saturn and beyond, we find man's activities moving strongly into yet another new arena—the high seas of space. Already the United States and other major nations, including the Soviet Union, are making huge investments in space. Much of our communications, intelligence, weather forecasting, and navigation capabilities are now heavily dependent on space satellites. And, as history teaches us well, those nations or groups of nations that become preeminent in space will gain the decisive advantage of this strategic "high ground."

We must be determined that these advantages shall accrue to the peoples of the Free World; not to any *totalitarian power. We can improve the Shuttle, our railway into space, placing space stations at its terminals and sharply reducing the cost-per-pound of material put into space. We can thus open the doors of opportunity to develop entire new space based industries, promising new products and new jobs for our people on Earth. We can eventually create the means to bring back to Earth the minerals and the inexhaustible solar energy available in space. By doing so, we can confound the gloomy predictions of diminishing energy and material resources available here on Earth. This will not only enhance the prosperity of the advanced, industrialized nations of our Free World, but will also provide the means to solve many of the hitherto intractable problems of the developing countries.*

Further, we can place into space the means to defend these peaceful endeavors from interference or attack by any hostile power. We can deploy in space a purely defensive system of satellites using nonnuclear weapons which will deny any hostile power a rational option for attacking our current and future space vehicles or for delivering a militarily effective first strike with its strategic ballistic missiles on our country or on the territory of our allies. Such a global ballistic missile defense system is well within our present technological capabilities and can be deployed in space in this decade, at less cost than other options that might be available to us to redress the strategic balance.

We need not abrogate current treaties to pursue these defensive options. A United Nations Treaty prohibits the emplacement of weapons of mass destruction in space, but does not prohibit defensive space weapons. The ABM Treaty requires discussion among Soviet and U.S. representatives of any decision to proceed with defensive systems "based on other principles" such as space systems. We should initiate such discussions and propose revisions, if necessary, in the ABM Treaty which is scheduled for review this year.

Essentially, this is a decision to provide an effective defense against nuclear attack for our country and our allies. It represents a long overdue concrete rejection by this country of the "Mutual Assured Destruction" theory which held that the only effective deterrent to nuclear war was a permanent threat by the United States and the Soviet Union to heap nuclear devastation on the cities and populations of each other. The inescapable corollary of this theory of MAD (perhaps the most apt acronym ever devised in Washington) was that civilian populations should not *be defended, as they were to be considered hostages in this monstrous balance of terror doctrine. The MAD doctrine, which holds that attempting to defend ourselves would be "destabilizing" and "provocative," has resulted not only in the neglect of our active military and strategic defenses and our civil defense, it has also resulted in the near total dismantlement of such strategic defenses as we once had.*

For years, many of our top military men have decried the devastating effect the MAD theory has had on the nation's security. In fact, our military leaders have, over the years, denied its validity and tried within the limits of their prerogatives to offset its ill effects. But those effects are readily evident. The only response permitted under MAD to increased nuclear threats to the United States or to its allies was to match these threats with increased nuclear threats against the Soviet Union. Further, a U.S. strategy which relied at its core on the capability to annihilate civilians and denied the soldier his traditional role of defending his fellow citizens has had a deleterious effect on the traditional American military ethic, and on the relationship between the soldier and the normally highly supportive public.

This legacy of MAD lies at the heart of many current problems of U.S. and allied security. We should abandon this immoral and militarily bankrupt theory of MAD and move from "Mutual Assured Destruction" to "Assured Survival." Should the Soviet Union wish to join in this endeavor—to make Assured Survival a mutual endeavor—we would, of course, not object. We have an abiding and vital interest in assuring the survival of our nation and our allies. We have no interest in the nuclear devastation of the Soviet Union.

If both East and West can free themselves from the threat of disarming nuclear first strikes, both sides will have little compulsion to amass ever larger arsenals of nuclear weapons. This would most certainly produce a more peaceful and stable world than the one we now inhabit. And it would allow us to avoid leaving to future generations the horrendous legacy of a perpetual balance of terror.

What we propose is not a panacea which solves all the problems of our national security. Spaceborne defense does not mean that our nuclear retaliatory capabilities can be abandoned or neglected. The United States would still maintain strategic offensive forces capable of retaliation in case of attack. The Soviets, while losing their advantage in first strike capabilities, would still be able to retaliate in case of attack. Nor does our approach to the strategic nuclear balance eliminate the need to build and maintain strong conventional capabilities.

We Americans have always been successful on the frontiers; we will be successful on the new High Frontier of space. We need only be as bold and resourceful as our forefathers.

Senator WARNER. Thank you very much, General.

We will put into the record much of the material that you have provided, but perhaps you could give us the structural framework of what High Frontier would encompass.

For example, take the 1983 budget submitted by the President, wherein would you subtract and add?

General GRAHAM. Well, put up that chart of the layered defense, would you?

What we are proposing is a space-borne defense air center that is an effective filter against Soviet systems on the rise. A midcourse defense, it catches what goes through. And this might involve lasers, but we think it probably would involve the same system here but just with better sensors, long-wave infrared.

This is the point defense that we get in 2 or 3 years if we go to achieve the simple defense. It is the one wherein I believe today there are significant tradeoffs.

If one does not perceive space defense as ever becoming available, at least in any reasonable amount of time, then point defense must be, as the Army has pursued it in the past, a system which as some growth potentials to protect cities as well as silos, that you can expand to an area defense.

But if you can see this downstream you do not need to go for that expensive a system. This system we propose uses the same radars as the policeman uses to capture speeders, so they are cheap and expendable. As a matter of fact, they can be blown away one after the other, if you put a number of our antennas under ground it will take care of the problem; the problem of radar vulnerability goes away. You are not expending a great expensive phased-array radar if the system is attacked.

For $1 million you can defend 200 MX or any other missile sites. In the current budget there is some $662 million for the LoADS system. In my view, go in the High Frontier direction and you get it a lot cheaper. As a matter of fact, that $662 million is most of the $800 million required to get all of the systems we are talking about, civil and military, under way.

There are other places where you can find tradeoffs. Can I see the space system chart?

The space system we are talking about is a large number of satellites, as a matter of fact, 432. They are simple satellites, using equipment essentially off-the-shelf. So the total system costs somewhere between $10 and $15 billion. You see $13.1 billion, Boeing has said as much as $14 million if you put them up with an MX booster.

But once you get them up, you have them all orbiting in space you have a geodesic dome of satellites constantly moving around the Earth. For their original purpose of missile defense they are communicating with each other.

That means that you have a communications system in space of enormous potential and in our view quite invulnerable. Given what this committee has to deal with in terms of C^3I many billions are required to correct that problem. There certainly are more tradeoffs by using this system as part of the answer to hardening the C^3 problem. Those are a couple of the examples.

Another example is that this system would become a far more effective antisatellite system than the ones that are now being proposed. So, there are a number of tradeoffs without ever touching any of the major weapon systems like the B-1, MX, and so forth. There are tradeoffs because the function could be served by the systems we are talking about. These are sufficient tradeoffs that all the High Frontier effort—not just the military but the civilian effort as well—is taken care of.

Senator WARNER. General, being a man thoroughly familiar with the organizational structure of the Department of Defense and the relative roles and missions of the military departments, under your proposal, what would become of the adjustment required in the roles and missions of the Department of the Army, Department of the Navy, and Department of the Air Force?

General GRAHAM. Well, we have had problems in the military services—not their own fault, necessarily—but one of the reasons why an outside outfit like High Frontier comes up using technology that has been lying around for many, many years for this concept is because the Army was charged with strategic defense and the Air Force had the space business.

The Army is by nature unlikely to come up with a strategic defense solution that requires it to be handed over to the Air Force.

The Air Force, on the other hand, has not ever been much interested in defense. So, this whole thing falls through the crack. And of course it fell through a bigger crack up the line because you had NASA over here saying, "Everything is for peaceful uses," and the DOD over here saying, "Well, we will take care of the military side." So, it fell through two big cracks to the floor.

The systems I have described to you here, Senator, we could have them now, had it not been for the way we organize ourselves.

Senator WARNER. To what extent has the Department of Defense listened to your proposal?

General GRAHAM. I think that the Secretary of Defense is quite interested in the basic proposal. I think that my colleagues from the Pentagon reflected the attitude of the Department of Defense quite well in that they are interested in any concept that can get us out of the strategic dilemma we are in.

Unfortunately, when you do make a definite strategic turn one tends to knock over the apple carts of various turf guarders—not only within the Pentagon but elsewhere within the Government.

So, we have expected and we have gotten resistance from those whose priorities or ongoing programs might be threatened by the High Frontier concept.

SPACE-BASED LASER TECHNOLOGY

Senator WARNER. General, we thank you very much for your contribution to this hearing today. We will now turn to our next witness, Dr. John Rather, president, Pan-Scion, Inc., a research firm, who will give us his view on space-based laser technology and the role it might play in future components of American national security.

STATEMENT OF DR. JOHN RATHER, PRESIDENT, PAN-SCION RESEARCH

Dr. RATHER. First, sir, I would like to express my thanks for the opportunity to testify on this matter which I think all of us agree is of crucial significance for the future of the United States and the world.

The fact that these hearings are being held at all reflects widespread awareness of the potential of space lasers. It is widely perceived that space lasers might ultimately free us from a massive nuclear attack. It is less well perceived, but equally important, I think, that they also would open up entire new spheres of activity for projection of nonnuclear force anywhere in the world.

Even modestly exploited space lasers could obsolete air power in the usual sense, because airplanes could easily be destroyed. Similarly, ships and aircraft carriers would be highly vulnerable. You can imagine what would happen if the decks of a carrier were raked by radiation a hundred thousand times as bright as the Sun. Surface armies would also be equally vulnerable.

READINESS OF LASER TECHNOLOGIES

The debate centers not on whether there are great potential payoffs for military applications, but rather when these potentials will be realized and how The "when" debate mostly turns on the question of the readiness of the technology.

There are those who will tell you eloquently that the technology is so primitive that we might as well forget it until the next century, if then. I doubt if those people would argue that we will never achieve potent directed energy, just that it will be a long time from now.

I strongly disagree with that viewpoint. I have been directly involved with working with all aspects of the relevant technologies for many years. This past year I have repeatedly visited all of the relevant laboratories; and DARPA permitted me to independently assess much of the proprietary work being pursued by industry.

I was tasked by the former director of DARPA to look at all of the known possible laser technology alternatives and to recommend what appears to be the shortest path to achievement of a system that could perform high payoff missions with high confidence of success.

I have spent the last 3 years on this problem, with lots of help from other people.

I think that there are several avenues to success by 1990, but not by any of the presently conceived straight and narrow paths.

ALTERNATIVE PATHS TO SUCCESS

The thing that I am most afraid of in a national laser program is failure. We do not have to fail, but we must look at the history of technology to see how to avoid it. When we consider the major technological quantum jumps that have occurred in the past century, there is the clear, common thread evidenced, for example, in the Manhattan project, the ICBM development and deployment program, and the Apollo Moon program.

First of all, the Government decided what capabilities it wanted and when it wanted those capabilities. Then the Government committed itself to provide the needed level of support for enough years to reach the desired goals.

Next, the needed management structure was established, usually from new cloth, and it was empowered to bring together the required talents and to make the needed technical decisions to get to those goals.

In all cases the best route to success was not perceived at the beginning of the program. It is interesting to look back at the Manhattan project. When we embarked on it in 1941, we had only separated micrograms of uranium 235 from 238. We built in 3 years three entirely different large-scale separation systems, two of which worked. The third one was converted into the world's largest biology laboratory at Oak Ridge.

In the second program, the ICBM program, when we embarked on it, we did not know how to build a warhead that would reenter the Earth's atmosphere. We looked into everything from heavy copper to ablative reentry vehicles; and we were also pursuing in parallel the development of large and small liquid-fueled missiles and solid-fueled missiles. We developed all of these things together, and we got what we needed within about 5 years.

In the Apollo Moon landing program the hydrogen propulsion, which was the key to success, had not been tamed at the beginning of the program in 1961. Lunar orbital rendezvous had not been even thought of seriously because Earth orbital rendezvous was still 4 years away, and the computers necessary for success had not been built. All of these things were done within 8 years.

We see in these examples a sharp contrast with the present situation where we are separately and repeatedly assured that all competing technologies are adequately funded, but in fact there is little room for bright, new innovations to emerge.

Now, I would not be here today if I did not think that good solutions to the space laser problem are possible. Again, I think the potential value of such systems is clear and that all the needed technologies are mature enough to begin a program.

But I think the best route to success has not been identified. There are objective and analytical ways to reach the correct paths, but this will require a breadth of effort that has just not yet been placed in evidence.

The needed program must maximize the gains by identifying common threads that unite all of the potential systems. For example, any reasonable space-based laser weapon system would necessitate a virtuoso ability to build adaptive optics to control the phase of light. Thus we must learn to build large phased transmitting arrays for light, just as we do for radar. As a corollary capability, we have to learn how to combine beams from several lasers. If we succeed in doing the first thing (large-scale adaptive optics), we can also do the second. So, the present emphasis on higher and higher laser powers might be offset by the ability to bring together the powers of numerous smaller lasers, changing present research thrusts in a way that will achieve the needed results sooner.

Also, we must minimize technological risks by identifying logical flaws is proposed systems. For example, we do not want to build high energy laser systems that concentrate inside such of the system a radiation flux that we would call "lethal" if we transmitted it to a target, because if you can build a mirror that can survive inside a system, why can you not hang such a mirror on the front of a device designed to home on the laser and kill it? In other words, such a mirror could harmlessly deflect the beam. So, there are logical problems that have to be addressed. I am afraid that present laser efforts largely ignore such problems.

We have to hedge our bets by not going for a single-point solution and prejudging its success.

Now, I am not trying to gore anybody's "sacred cows," I am just saying that there is plenty of room in the pasture for more than one animal, and we will all be hungry eventually if we do not have several out there.

From this remark you may immediately think, "Well, the cost will skyrocket if we try several things at once." On the contrary, it will be the wisest investment to keep all the options open while doing the needed experiments to reduce the risks. We have to concentrate on the unifying principles rather than on some sort of test-bed stunt that will not leave us anywhere if it succeeds or fails.

We have already seen enough evidence of what happens when early perceptions of potential great payoffs have led to premature attempts to make existing technologies look like weapon systems. Quite a bit of the $2.5 billion that has already been spent on defense lasers has been applied that way.

Let me make it as clear as I can that my objectives are two: One, to get a large and well-run program going soon; and two, to get initial operating capability of a well-conceived, highly potent and defendable space laser system within this decade. I think both of these things can be done and done well; but the program has to be conceived with the widest possible technical base, and this is not now the case.

It is very regrettable that so much of the debate thus far has been posed in terms of one person's opinion versus another's, or one technology versus another. The real issues are much broader than that.

If some of today's opinions are wrong, you have to have fall-back solutions. You do not want to take off like 'Gang Busters" down a path that automatically excludes other things, because the required leadtimes are years long; and you can get yourself into a situation where you wind up years behind and cannot catch up.

INADEQUACIES OF PRESENT PROGRAMS

At present, catch-22 with regard to basic research in lasers (and in many other areas) takes the form that new work cannot be funded because not enough research has been done to prove its worth. More specifically, there is a momentum now that makes it difficult to pursue more promising but less well developed laser devices and systems approaches, that is, things that could potentially provide the breakthroughs necessary to move rapidly beyond the present restrictive brightness and run-time of existing lasers.

I personally think that it is a national travesty that the free electron lasers (FEL's) are not being pursued on a crash basis, because there is ample evidence that they hold a probable solution for the need for sustained high power at short wavelengths. Talk with the people that are doing the FEL work, and you will be amazed how little support exists for one of the most important scientific breakthroughs in decades!

But the primary objection to any single-point solution, whether it is FEL or chemical laser or whatever, is that it prejudices and prejudges or ignores serious questions of technological risk.

We need to stop talking and start cutting broad metal to identify what things are common and universally good or usable, and what things are different and unique, and involve particular paths.

The knowledge base exists to properly structure a program and I am sure that program expenses can be compressed by careful consolidation of effort. I just do not want to see huge amounts of money blown away for things that are already perceived as being of questionable military utility.

My own research has convinced me that there is now enough technological know-how to put together a high payoff system. But I also am very much afraid that we can take a wrong tack at the outset that can devour so much of the available resources that all parallel efforts go begging.

This will be disastrous in the extreme if the initial choices turn out to be wrong because I firmly believe that the Soviets are moving at top speed toward a full operational space-laser capability, and that it is possible for them to checkmate us by gaining control of space.

I am reminded of the 19th century Mariners Manual which posed its discussions as questions and answers. Question: "What do you do if your ship is caught in a gale between a reef and a lee shore?" Answer: "You should never allow your vessel to be found in this situation!" I think that is the situation we are getting into.

Now, I will be glad to answer any questions.

SOVIET THREAT

Senator **Warner**. Let me put this one question to the panel. What is your basic view respecting the threat facing the United States and the quantum of funding with which we are now addressing it? General?

General **Graham**. Well, in my view it is very hard to find any measure of military capability in which the United States has the edge over its greatest potential enemy, the Soviet Union.

Further, if we are not careful, the Soviets will cap those capabilities with superiority in space. A recent press leak and so forth—whatever they say about technology—suggests that the Soviets are trying to do that very hard.

Therefore, it seems to me that there never has been a time in American history when we must insure that adequate funds are given to the military.

Now, that does not mean that everything that my old friends in the Pentagon come up with must be funded. We need more than money—a strategy. We need more than just money given to the forces. We need a way for the American people and their representatives here in Congress to describe where you are going with this money; what it is going to do for you, and how it will affect your security and the security of the free world.

I think that is the missing facet that makes it difficult for those in Congress and elsewhere to realize we must sacrifice to take care of our military capabilities, to get that story across to the American people.

SOVIET PHYSICISTS SHARE NOBEL PRIZE IN LASER TECHNOLOGY

Dr. RATHER. I am constantly reminded that two Soviet physicists, Basov and Procharov, shared the 1964 Nobel Prize with Charles Townes for the invention of the laser. It is known that there are about 700 Ph. D.-level physicists at the Lebedev Institute in Moscow working on laser problems, all consolidated in one place.

It has repeatedly been reported that ground-based lasers are moving ahead rapidly in the Soviet Union. I think that the whole question of what can be done from the ground up, antisatellite, versus what can be done in terms of catching a laser beam on a reflector in space and redirecting it to a target, has not been adequately looked at by the United States.

I feel that there are open doors in many areas for leap-frogging ahead in technological readiness by taking advantage of that sort of ploy where you do not have to deploy the entire heavy, complex system in space but might take a shortcut. The Soviets may be doing this.

So, everything I know and perceive about the Soviet threat seems very real to me. In the particular area of free electron lasers, which I mentioned, they are some of the best accelerator builders in the world, and they are probably ahead of us. They have published many FEL papers in the open literature. I know that they are working on it.

Senator WARNER. Mr. Day, do you wish to comment?

Mr. DAY. If I may just make a comment. The budget being a finite thing and resources being as limited as they are, the wisdom in which money is authorized, and appropriated, and funded, bears more importance today than ever.

With regard to these space-based lasers I think the question is, at what pace should this technology be pursued? Should it be technically motivated or should it be budget motivated? If the technology is there, some would argue that we should pursue it vigorously, whereas others would disagree.

This, of course, is the dilemma that the Congress faces, how to fund not only this program but many others that are in the same kind of situation.

Senator WARNER. Well, gentlemen, I thank you for your very comprehensive advice and contribution on this area of the defense budget. On behalf of my colleagues and the chairman of the committee I express our appreciation.

We hope that certain questions which we have not had the opportunity to ask today can be submitted for timely response. Thank you very much. I will submit questions to all of you for the record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER, ANSWERS SUPPLIED BY DONALD E. DAY, GAO

DARPA TRIAD PROGRAM

Senator **WARNER**. Toward what end should we be pursuing the technologies being developed under the DARPA Triad program? Should the purpose be to develop and test an integrated space-based laser system—albeit one of somewhat marginal military capability—or should it be pursued simply as a technology development effort, not intended to lead to a near term deployment in space?

Mr. **DAY**. The present DOD space laser program does not have the goal of providing for an integrated space laser demonstration. The current DARPA program is structured to independently demonstrate the three major components of a space laser system. This approach risks keeping the potentially revolutionary technology in component development for the foreseeable future. The point GAO is making is that a decision needs to be made now on the type and pace of a space laser program to be pursued.

Senator **WARNER**. How do you feel about taking a less-than-mission-capable laser system consisting of off-the-shelf components and attempting to integrate them in a space platform, primarily to see what the technical challenges and difficulties are in performing such integration and operations in space?

What could be achieved by such an approach and what would you anticipate the likely costs of using, say, a space telescope system for the optics system and other near term components to comprise the rest of the laser system?

Mr. **DAY**. GAO's space laser report summarizes several advantages of a sub-scale on-orbit feasibility demonstration. One of these advantages is the integration of the major laser subsystems into an operational space laser system which will provide knowledge needed to resolve important engineering and technical issues. Without such an integration effort, the U.S. will not be able to address some of the most important weapon system issues such as surveillance, command and control and battle management. These are essential for any deployed weapon system. I might point out the U.S. experience in integrating the major subsystems of any high-energy laser system is limited.

An on-orbit feasibility demonstration will be expensive. Cost estimates would depend on system size and capability.

GROWING SOVIET SPACE THREAT

Senator **WARNER**. Are you in basic agreement that the United States faces a significant and growing threat from Soviet space activities and that more effort and resources should be expended by this country to maintain a competitive space capability for the U.S.?

Mr. **DAY**. The GAO report on space-based lasers did not address the broader issues of overall interest in space by both the U.S. and the Soviets. Therefore, I do not believe it is appropriate to comment.

Senator **WARNER**. Are you concerned that a crash, Manhattan-style program to deploy chemical-lasers in space could result in a significant starving of funds for other, possibly more promising technologies?

Mr. **DAY**. I would be gravely concerned if the decision to pursue such a crash program was made in haste and without full, conscious consideration of its impact on other possibly more promising technologies. This kind of situation presents a dilemma the Congress and the DOD is repeatedly faced with. I feel that in this time of budget constraints on one hand and the threats presented by our adversaries on the other, it is essential to carefully weigh all factors in making decisions of this nature. In the final analysis, the overall national security interests of the Nation has to drive such decision.

This is not to say that some program acceleration is appropriate. Our report discusses two technology paced programs which may be a more prudent program for demonstrating the potential of space lasers. However, these programs are initially more expensive than the present DOD program.

Senator **WARNER**. You have heard Dr. Cooper and Gen. Lamberson testify that the present SBL program is adequately funded and technology constrained. Your report apparently disagrees. Would you comment?

Mr. **DAY**. GAO disagrees with DOD officials who state that the current space laser program is a technology constrained effort. Based on information available to GAO, it is a conservative funding-limited approach to developing the technology for space lasers. A technology-paced program, either with or without an on-orbit demonstration, is significantly more expensive than DOD's present program. Again, the GAO report states that a decision should be made on the type of space laser program to pursue. Once this is decided the task must be properly organized and funded.

CHEMICAL LASERS

Senator WARNER. Would you care to comment on Dr. Rather's characterization of the availability and utility of chemical lasers for some of the demanding missions their proponents anticipate for them?

Mr. DAY. DOD studies indicate that chemical laser technology is currently the best understood laser technology for applications in space. A diversity of opinion exists, however, on whether chemical laser technology is scalable to support a missile defense laser system that would be effective and affordable. The dilemma that needs to be resolved now is whether we should exploit the chemical laser technology which is in hand or wait for the development of other laser concepts which hold the potential of being more effective. There are many other system issues needing resolution in addition to the laser device. Exploiting existing chemical laser technology in the near term would help resolve these other system issues.

Senator WARNER. How serious do you think the fact that "all SBL feasibility issues will not be fully addressed before a demonstration decision," is from the standpoint of programmatic and resource-allocation risk?

Mr. DAY. It is very important that all significant issues be addressed so that sufficient information is available to make an informed decision on the future prospects of space-laser weapons. Addressing these issues could reduce program risk and provide higher confidence that space lasers technology is ready to enter the weapon system acquisition process. There are recent examples where systems advanced through the acquisition process without sufficient demonstration that technology was in hand and later experienced problems of achieving cost, schedule, and performance goals.

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER, ANSWERS SUPPLIED BY LT. GEN. DANIEL GRAHAM, USA (RETIRED), HIGH FRONTIERS, INC.

SOVIET SPACE ACTIVITIES

Senator WARNER. Are you all in basic agreement that the United States faces a significant and growing threat from Soviet space activities and that more effort and resources should be expended by this country to maintain a competitive space capability for the United States?

General GRAHAM. Yes. Any nation that achieved the ability to deny others access to space, for either military or non-military purposes, while itself being free to enjoy access to its enemies and competitors from space would become the dominant power on earth. This is not a new conclusion but a historic fact with respect to the role of control over access in and from the decisive media—land, sea, air, space, etc.—at any time. It applied to land, seas, and control. It will, in due course and when technology permits, apply to space control. The Soviets understand this and are working hard to acquire this capability. Over 75 percent of the Soviet space effort is militarily oriented. While this may not be an immediate threat it is a growing one. As the Soviet space capabilities improve they must be countered by the U.S. in timely fashion. Due to the lead times involved if we wait until this threat is upon us it could be too late.

Senator WARNER. Are you concerned that a crash, Manhattan-style program to deploy chemical-lasers in space could result in a significant starving of funds for other, possibly more promising technologies?

General GRAHAM. No. First, High Frontier does NOT recommend a crash program on chemical lasers, or on any other laser weapons. These we consider to be second generation, follow on, systems which should be given suitable development priority but not necessarily built under a Manhattan Project-type of effort. High Frontier first generation layered defense systems are essentially state of the art today. This was one of the study's requirements. The funds required to meet the High Frontier deployment schedule can be mostly found by reprogramming some present and planned fiscal year 1983 and fiscal year 1984 monies now allocated to systems with essentially similar roles, such as for deep basing or other schemes for MX survival, LoADS, etc. The Manhattan style effort we refer to in our study applies to management of the acquistion porcess. If we are to meet our time and cost schedules we must eliminate today's built in decisions and making review delays, as well as those acquisition procedures which have raised the 1950s average acquisition time to six years for new systems to some 13 years today.

SOVIET WARHEAD INVENTORY

Senator **Warner**. Why would your layered defense system be totally insensitive to increases in the Soviet's warhead inventory?

General **Graham**. The maximum number of warheads any nation needs is that required to accomplish its war plans, that is to effectively and assuredly destroy those targets deemed necessary. These quantities relate to targets to be destroyed not to quantities of weapons on the other side. Unfortunately, pressures to increase the quantity of warheads over and above these basic requirements result from the prospects of wartime losses especially to a Soviet first strike. The greater the Soviet offensive inventory the more we are likely to lose hence the more we need to build. Thus the strategic warhead race is more a function of anticipated losses versus residual requirements that it is a reflection of military needs. The warhead competition is greatest when there are no defenses. Conversely, if any nation can be assured that its basic retaliatory needs will survive, by virtue of having effective defenses, it has no need to build additional warheads regardless of increases in the enemy's inventory and so long as its defenses can cope with such increases. Given an effective active ICBM defense system the competition for quantity shifts from relative offensive numbers to one of defense intercept capability versus offensive capabilities.

Senator **Warner**. Why do you feel that the technological risks and lead-times involved in developing and deploying the various defensive systems your study proposes are not—as Dr. Cooper has indicated—sufficiently great to preclude near-term availability?

General **Graham**. We have examined this with several major corporations that would build our systems. All our proposed first generation systems have essentially little or no technological risk associated with them since they are based on 1981 state of the art. They have far less technological risk than did Atlas or Polaris when they were approved for acquisition in the 1950s, and we have allowed more time. As to lead time it must be emphasized that our High Frontier times and costs assume the special acquisition management arrangements we propose in the High Frontier study. If you proceed with the acquisition of our capabilities but under today's DOD methods and regulations the lead time not only will be such as to place near term availability in jeopardy, but costs will greatly increase since, on the average, each year of delay in the acquisition cycle of a major weapon system adds about 30 percent to its all up costs.

COST OF EFFECTIVE DEFENSE

Senator **Warner**. Specifically, how long would it take and how much would it cost to provide 95 percent effective defense you have proposed?

Have you had any reputable engineering and scientific experts review the product of your own, in-house team?

General **Graham**. We have estimated it would take about $17 billion ($2 billion for point defense for the MX and $15 billion for the first generation global defense capability). We claim about two years to have in place the point defense and five years for the first phase satellite defense system we propose under our recommendation acquisition approach. These two could provide some 80 percent or better effectiveness. The third and last layer we proposed—mid-course interception—may require two or three additinal years to implement and would be needed to reach the theoretical 95 percent. But, these percentages are not critical. Our goals for even a 20 percent effectiveness will achieve the basic first strike deterrent objectives of the study and thus re-establish the President's desired margin of safety.

With regards expert validation, yes. We have had several major aerospace corporations review our figures. Some contributed their own suggested figures which we have incorporated where appropriate. In addition, expert consultants also reviewed and validated these. High Frontier was NOT just an in-house team effort. It was a validation of the proposed strategy and technology by expert corporate and individual consultants. A list can be found in the report.

HANDLING IMPLICATIONS OF THE ABM TREATY

Senator **Warner**. How do you believe the United States should handle the implications of the system you have proposed for the ABM Treaty?

General **Graham**. The proper order of events to implement our High Frontier proposals would be: first, for the President, DOD, and the JCS to clearly accept and define a national security requirement for a layered defense with a space based concept. The need for such a formal requirement should properly preceed DOD/DDR&E, or any other, serious development and acquisition actions and funding.

Once a requirement has been stated and the strategy accepted ACDA, State, and DOD would evaluate the implications of this on the ABM Treaty and propose suitable modifications, or its elimination as appropriate. Our High Frontier Study of these implications merely pointed out that the U.S. can proceed towards the High Frontier capabilities in the near term with little or no modification to the Treaty as it is now worded since we are allowed one ICMB field defense system; and the right to research ABM systems. In addition, the space based systems we envision do not conform to the definition of prohibited ABM systems in the Treaty language. In the real world, however, full-blown implementation of Assured Survival would eventually be incompatible with an ABM Treaty of the type we now have. I should add that in the publicity, talk shows, and press conferences we have had on High Frontier to date the impact on the ABM Treaty has suprisingly proven to be a "non-issue."

Senate WARNER. Toward what end should we be pursuing the technologies being developed under the DARPA Triad program?

Should the purpose be to develop and test an integrated space-based laser system-albeit one of somewhat marginal military capability—or should it be pursued simply as a technology development effort, not intented to lead to a near-term deployment in space?

General GRAHAM. We need to plan for an on-orbit feasibility demonstration of an integrated laser, optics and tracking system (i.e., the Triad). Toward this first systems goal we must assure that the elements of the Triad development be in step with one another. Only the point of the integrated system makes sense and deployment should be considered only after on-orbit tests of the integrated system. The goal of on-orbit testing should have high priority.

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER, ANSWERS SUPPLIED BY DR. JOHN RATHER, PAN-SCION RESEARCH

DARPA TRIAD

Senator WARNER. Dr. Rather, let me ask the question I asked the earlier panel: Toward what end should we be pursuing the technologies being developed under the DARPA Triad program?

Should the purpose be to develop and test an integrated space-based laser system—albeit one of somewhat marginal military capability—or should it be pursued simply as a technology development effort, not intended to lead to a near term deployment in space?

Dr. RATHER. More comprehensive efforts on technology development should not preclude early test of an integrated space-based laser—perhaps even one of significant military utility. What should not be done is to prematurely focus all technology development on a single approach to a system demonstration. The result of this approach, which seems to be Triad approach, could well result in a dead-end system similar in potential military utility to the Airborne Laser Laboratory.

Senator WARNER. Dr. Rather, are you all in basic agreement that the United States faces a significant and growing threat from Soviet space activities and that more effort and resources should be expended by this country to maintain a competitive space capability for the United States?

Dr. RATHER. It is obvious from unclassified sources that the Soviets have a more vigorous and better-supported space program than does the United States—in spite of Soviet rhetoric on the peaceful nature of their space program, it appears to be primarily focused on military applications. Therefore, if we cannot secure a verifiable agreement to restrict or eliminate military activities in space, it seems to me that we have no choice but to embark on a more competitive program.

SYSTEM INTEGRATION FOR INTEGRATION'S SAKE

Senator WARNER. Dr. Rather, how do you feel about taking a less-than-mission-capable laser system consisting of off-the-shelf components and attempting to integrate them in a space platform, primarily to see what the technical challenges and difficulties are in performing such integration and operations in space?

What could be achieved by such an approach and what would you anticipate the likely costs of using, say, a space telescope system for the optics system and other near-term components to comprise the rest of the laser system?

Dr. RATHER. Integration of current off-the-shelf components into a space-based laser system just for education of engineers would be costly and counter-productive. The cost, even using proven components, would be such that military utility should be demanded. If the system is unable to demonstate such utility it will give opponents of the space defense concept good ammunition to use against any further efforts to develop a more useful system.

FREE-ELECTRON ALTERNATIVES

Senator **Warner**. Dr. Rather, you seem to agree with Dr. Cooper and Gen. Lamberson concerning the desirable physical characteristics of short-wave length lasers, but dispute their conclusion that such lasers are far-term possibilities. Would you comment?

Dr. **Rather**. Given the current funding support, the FEL is a far-term possibility. However, given clear direction, appropriate funding, and (most importantly) instructions to change priority on available accelerators such as the Advanced Test Acceleration at Livermore, there is a high probability that a FEL based short wavelength system could be developed on a schedule compatible with that of the Triad chemical laser demonstration.

Senator **Warner**. The hearing is adjourned.

[Whereupon, at 4:50 p.m., the subcommittee adjourned, to reconvene subject to the call of the Chair.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

WEDNESDAY, MARCH 17, 1982

U.S. Senate,
Subcommittee on Strategic and
Theater Nuclear Forces,
Committee on Armed Services,
Washington, D.C.

CIVIL DEFENSE

The subcommittee met in executive session at 9:55 a.m., pursuant to notice, in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senator Warner.

Staff present: Frank J. Gaffney and Patrick L. Renehan, professional staff members; Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen, and Robert Nichols, assistant to Senator Jackson.

Senator **Warner**. We will proceed.

We will discuss the aspects of the President's civil defense program that you feel should be kept classified. Mr. Perle, you may proceed.

STATEMENT OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE, ACCOMPANIED BY BRIG. GEN. WILLIAM L. DOYLE, JOINT STRATEGIC TARGET PLANNING STAFF, ORGANIZATION OF THE JOINT CHIEFS OF STAFF, AND CRAIG ALDERMAN, JR., DIRECTOR FOR EMERGENCY PLANNING, OFFICE OF THE UNDER SECRETARY FOR POLICY

Mr. **Perle**. I had planned, Mr. Chairman, to discuss very briefly the relationship between the Department of Defense which has oversight responsibility for civil defense along with the National Security Council—and the Federal Emergency Management Agency. That is, to indicate that essentially we support the FEMA program and we believe it is consistent with the goals the President has established.

We are quite pleased with the working relationship that has developed between FEMA, the Department of Defense, and the NSC. There was an unprecedented level of cooperation on the oversight responsibility.

As you know, a little more than a year ago we indicated that there was a review under way of the administration's plans for civil defense. That review is now complete and a decision was made to increase the resources devoted to civil defense, to expand the program on a nationwide basis, and to lay the groundwork for repairing deficiencies in previous programs.

The decision was announced last October and it was subsequently codified in the National Security Decision Directive and that NSD has replaced the old PD-41 as a statement of administration's civil defense policy.

Senator WARNER. The main thing that I am concerned with, Mr. Secretary, is, as we rethink our strategic policy all of the way from the manufacture of weapons themselves to the, if possible, utilization, wherein does this new initiative fit?

Is this a product of the rethinking of our strategic policy or is it just a President coming along and feeling that national defense or civil defense has been neglected and he has decided to do something about it?

Or is it a combination of the two?

Mr. PERLE. I think it is a combination of the two.

Senator WARNER. Before you answer that question I have to absent myself briefly.

[Brief recess.]

Senator WARNER. I appreciate your indulgence, and I apologize. We have to do a variety of things up here, and Chairman Tower said we have to get this bill finished by April 3, so I am averaging 6 hours of hearings a day. However, we have to attend to other business as well.

Now, Secretary Perle, I asked you the question, about the relationship between the President's program and the national strategy.

Mr. PERLE. Mr. Chairman, they are entirely consistent. The national strategy is to restore the strategic balance.

Senator WARNER. I think it would be helpful even though it would take a few minutes, to look at the national strategy over the last two decades and where it is today and how as a natural evolution of the most recent chapter of that strategy we should, as a nation, begin on this program.

Mr. PERLE. Well, if one goes back to what I suppose one could call the first national strategic policy in the 1950's, it was, as you know, a policy of massive retaliation. The notion was that with the superiority we then enjoyed in strategic nuclear weapons we would maintain the capability of retaliating against aggression, even conventional aggression by the use of strategic nuclear forces.

As the Soviet strategic force evolved, and as we began to appreciate the potential vulnerabilities in our own case, and as the credibility of the Soviet threat to retaliate with nuclear weapons even at lower level provocations evolved and became increasingly clear, we moved to a strategy of flexible response in which our response to aggression was to be measured and appropriate to the level of aggression originating on the other side. With the overall design of the strategic Triad that we put into place in the 1960's, our concern became one of assuring the survivability of our strategic forces in the face of the mounting Soviet threat.

In recent years as the Soviets have achieved the capability to attack elements of our strategic Triad we have increasingly devoted resources to fixing vulnerabilities as they have arisen.

Senator **Warner**. What was that statement?

Mr. **Perle**. We increasingly devoted resources to fixing the vulnerabilities rather than expanding the overall capability of our forces.

For a long time the theory was that we could maintain our security by having an ability to respond to an attack by the Soviet Union with an attack against the industrial base of the Soviet Union which would be disproportionate to any gains they might hope to achieve by attacking the United States—assured destruction as it came to be known. It became, in my judgment, unduly mechanistic. That is to say, calculations were made of the level of damage that we needed to be able to inflict and force procurement was driven in part by the necessity to provide a number of weapons sufficient to achieve those levels of destruction.

As time went on and the Soviet forces became more formidable and indeed, as their offensive capability not only matched our own but in important respects came to exceed our own, we came to the conclusion that we ought to be in a position to deal with more limited contingencies than the all-out nuclear exchange envisioned in the doctrine of assured destruction. This has variously been described as the Schlesinger doctrine, the doctrine of limited nuclear response and nuclear options, and today we are working very hard to assure that we are in a position to respond to something less than an all-out nuclear attack.

Consistent with this, and in the course of analyzing the relative capabilities of the Soviet Union and ourselves, it has become increasingly clear that their civil defense program could lead Soviet decisionmakers to conclude that the level of destruction we could inflict in retaliation, especially retaliation after an attack on our forces that significantly degraded them, could be kept within manageable proportions.

We, by contrast, have had virtually no civil defense program at all. Even those minimum measures that prudence dictates one ought to take have not in the past been taken, with the result that this administration came into office faced with a deteriorating strategic balance, an increasingly formidable Soviet offensive capability, projections that showed a declining surviving fraction of our own strategic forces, civil defense on the Soviet side and virtually no civil defense on our side.

So, in developing the program of strategic initiative that is intended to restore the strategic balance by reducing the vulnerability of our own forces, by modernizing our command control and communications which I think is clearly the weak, link, along with other deficiencies, by procuring a new generation of bombers that will be more survivable on the ground and better able to penetrate Soviet defenses, by the new ICBM that will correct the clear vulnerability of the existing force of fixed Minuteman ICBM's, and by improving the sea-based leg of the Triad by moving vigorously on that.

Senator **Warner**. I have got that part of it.

Mr. PERLE. Put that program together, and there is still a missing element which would be the continuation of the civil defense disparity; that is, the Soviets having a program and the United States not having a program. So the administration came to the conclusion that it was consistent with and indeed essential to the support of a modernization program to make a beginning on a civil defense program that would give us some capability to minimize the loss of life that would otherwise result in the case of an attack, in a nuclear attack of less than total proportions.

We believe that the fiscal year 1983 request, which is modest by comparison with the defense budget as a whole, or even any major program within the defense budget, is a sensible first step in acquiring that assurance. We do not believe that it is possible to achieve the levels of protection that would lead any reasonable person to conclude that the risks——

Senator WARNER. That was a key sentence and we had an interruption here.

Mr. PERLE. We don't believe, although the accusation is made sometimes that we do, that it is possible to achieve a level of protection that would lead any sensible individual to conclude that the risks of nuclear war had been diminished to the point where it would serve a useful policy purpose.

Senator WARNER. In other words, this program does not reduce the threshold of the likelihood of a nuclear confrontation; is that correct?

Mr. PERLE. That is correct.

Senator WARNER. Then the reverse is true, why do we need it? The reverse argument is, if that is the case, why do we need it?

Mr. PERLE. For one thing, we can't know what is in the mind of the Soviet leadership. We know from having looked at their program of civil defense that they take it very seriously indeed and that they regard it as an integral part of their overall force posture and doctrine. We therefore have to conclude that having made a significant investment in their own program, they consider that civil defense can in fact mitigate the consequences of nuclear war.

If they perceive us to be wholly lacking in any capability to protect the population in this country, that simply widens the gap between their perception of their strategic capabilities, and their perception of ours. It is the very essence of deterrence that a perceived gap in capability should not be permitted to exist. The last thing we want to do is take action that might have the effect of encouraging a Soviet leader, whoever he might be, to believe that the gap has now conferred upon them a degree of superiority that would enable them to intimidate the United States.

Senator WARNER. Which would in turn reduce the threshold of the likelihood of a nuclear confrontation?

Mr. PERLE. Exactly.

Senator WARNER. Now we are at the very heart of this issue, and what concerns me is that the American public, if they awaken to that justification, they are suddenly focused on, first, what have the Soviets done? That will eventually get out although much of it which has been received remains classified, and they are going to say, they are going to take your very words, we have put a very modest amount in this year's defense budget, whereas, the Soviet

Union—did I mention the $2.5 billion which is in the open now—and maybe it hasn't been for some time, and that doesn't include what they are doing in the economy and in their training and in their leadership protection.

Suddenly the American people are going to see a little speck over here that we are doing in contrast to the very massive continuation of a program which has been in effect for a decade and a half. How are you going to respond to that question? You can say it is serious that we close that gap but we are out of money and the effort doesn't measure up to that.

Mr. **Perle**. I think it is clear that the program on which we are now making a beginning is not going to close that gap totally. It will point in the right direction and it is a beginning. It is consistent with the level of resources that we can absorb, and with the implementation of some plans that have been carefully thought out. We think we know what we are doing with respect to these initial steps.

Senator **Warner**. That is important. It is consistent with the level of the absorption, of what we can do, and we could well trigger this fiscal year a program that the public is going to require be augmented and quadrupled next year, and quadrupled the ensuing year until we get to a level of investment comparable to that of the Soviet Union.

Then we have to look at what we have done in terms of drawing those funds away from what heretofore has been our basic strategy; namely, military deterrents as being the main protection.

Mr. **Perle**. I frankly doubt that we would be in a position to match the Soviets. Nor do I believe it is necessary to match the Soviets. I do think it is important that we make a start and we adopt those relatively simple measures like improving our plans for evacuation so that within the resource constraints that we face and given the background of the absence of a program for so many years, we make a start that the public will accept and understand.

The beginning of this process has a relatively high payoff. A small amount of money for planning can produce rather large effects.

Senator **Warner**. I agree with you on that.

INCREASING THE LEVEL OF PROTECTION

Mr. **Perle**. When you get down the road, increasing the level of protection to include industrial protection and sheltering, and blast shelter for large numbers of people, becomes an expensive proposition and reflects a different psychology. I frankly doubt that the American psychology would sustain the kind of program that it is possible to integrate into the Soviet society, which is so much more regimented.

Senator **Warner**. That remains to be seen.

Now, what about your other witnesses?

General, do you have anything that you feel should be exposed here?

General **Doyle**. Mr. Chairman, I would just like to echo what Secretary Perle said with regard to characterizing the strategy. As I believe you are aware, when we do our military capabilities planning for the SIOP, we certainly respond to that strategy. As you well know, it is not the policy of this country to attack people. So when we look at a basic mathematical equation today—you heard the 20,000 figure. There might be those who suggest——

Senator WARNER. What is that?

General DOYLE. That is 20,000 shelters, or 23,000, or whatever it is, keeping in mind that today we have on the magnitude of some [deleted] weapons for military planning, you see the mathematics presents a problem. If someone were to suggest that we have a capability to effectively plan against the Soviet civil defense system alone, as Secretary Perle has pointed out to you, our requirements and national objectives and strategy require us to plan for a variety of things, so we take that pie of some [deleted] and as you are aware divide them up to satisfy all of these objectives. The mathematics I would suggest of where we are at today are that we simply lack capabilities to do a variety of things and there is the kind of thing that we are talking about.

Senator WARNER. Are there any other comments from the other witnesses?

Mr. ALDERMAN. I am Mr. Alderman, and I run the Emergency Planning Directorate in the Department of Defense, Office of the Secretary of Defense. My office is a daily interface with FEMA on civil defense matters among other things.

I can add very little to what Secretary Perle has already said. He is very articulate and has done an excellent job of presenting the Department's position on the FEMA civil defense program.

We do support it and we helped build it and we believe it is a good program. We are 100 percent behind it, sir.

Senator WARNER. All right. I will insert questions to be answered for the record.

[Questions with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN W. WARNER

LEADERSHIP PROTECTION

Senator WARNER. In the earlier presentation you said a number of Soviet civil defense shelters provided for leadership protection. Are these sorts of facilities on the target list and what degree of confidence do you have that they can be neutralized:

ANSWER. [Deleted.]

CIVIL DEFENSE AND STRATEGIC TARGETING

Senator WARNER. How do you as a strategic targeting planner have to adjust your target base and force employment plan to account for and offset Soviet civil defense capabilities?

ANSWER. [Deleted] therefore, there is no adjustment required or accomplished.

Senator WARNER. What changes are imposed on your economic target assumption by Soviet population relocation planning?

ANSWER. None. National policy directs that we do not target population, per se.

Senator WARNER. Does the maintenance in the inventory of a large yield warhead like the Titan II represent your best means of countering such "hardening of soft targets?"

ANSWER. The best means of countering increasing target hardness is by improving our weapon accuracy, even those with similar yield. [Deleted.]

SOVIET RISOP AND CIVIL DEFENSE

Senator WARNER. From a strategic targeting point of view how effective does Soviet civil defense have to be in order to reduce to an acceptable level Soviet casualties if in effect it is simply a part of a more comprehensive system for reducing the ability of the United States to devastate the U.S.S.R.? I'm thinking of a Soviet planner conjuring up an attack in which most of the U.S. land-based missiles, in-port submarines, and nonalert bombers were destroyed in a preemptive attack, the U.S. NCA and C^3 system cease to function, and most of those U.S. strategic retaliatory forces that survive are intercepted or destroyed by Soviet barrage attacks against submarine operating areas, air defense against bombers, and ballistic missile defense? If one postulates such an attack, how good does Soviet civil defense have to be to make nuclear war fighting at least thinkable, if not indeed winnable?

Answer. In such an attack as you have postulated, the Soviets would not need a civil defense since Soviet forces have decimated the U.S. retaliatory capability. I do not think the Soviet planners think they have the capabilities you have hypothesized. [Deleted.]

TARGETING IMPLICATIONS OF ADDITIONAL MK12A BUY

Senator **Warner.** In the past there has been some confusion as to the attitude of the Strategic Air Command and Joint Strategic Target Planning Staff toward the desirability of acquiring additional MK–12A's for the remaining Minuteman III missiles equipped with MK-12A system. What are the tradeoffs associated with acquiring additional MK-12A warheads at the expense of larger less accurate single warhead systems from a targeteers point of view?

Answer. A targeteer always looks for the best weapon to target match. [Deleted.] Consequently, targeteers require a strategic weapons inventory suitable to this wide variety of targets.

Senator **Warner.** What is your understanding of SAC's and JSTPS's current position on expanding MK-12A loading in the Minuteman III force?

Answer. JSTPS does not have a position on this subject [Deleted.]

Senator **Warner.** We will break for a few minutes and then go into open session.

[Whereupon, at 10:35 a.m., the subcommittee was recessed, to reconvene in open session.]

OPEN SESSION

[The subcommittee reconvened at 10:40 a.m.]

Senator **Warner.** The subcommittee will now continue its testimony in open session.

We will return to Secretary Perle for his statement.

STATEMENT OF RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY POLICY

Mr. **Perle.** Thank you very much, Mr. Chairman.

Mr. Chairman, I appreciate this opportunity to testify before the subcommittee on behalf of the Federal Emergency Management Agency's proposed civil defense program for fiscal year 1983.

As you are aware, the Department of Defense and the National Security Council share responsibility for oversight of FEMA's civil defense efforts. In addition, each year the Department prepares a civil defense oversight report for the Armed Services Committees of Congress. That report assesses, among other things, the extent to which the program provided for in the FEMA proposed budget is sufficient to implement the civil defense policy guidelines prescribed by the President.

The oversight report that we were pleased to submit this year covers FEMA's proposed program for fiscal year 1983, and is the first report to be prepared using as guidelines the Reagan administration's commitment to improving and expanding our Nation's civil defense capability. With your permission, I will confine my remarks to a brief summary of its highlights.

On the basis of our assessment of program data provided by FEMA, we have concluded that the fiscal year 1983 civil defense program meets the requirements of the President's new civil defense policy.

A little more than a year ago, when testifying before this committee in support of FEMA's fiscal year 1982 effort, we noted that civil defense was one of a number of national security issues that had been scheduled for an intensive review.

To facilitate that review, the National Security Council staff formed an ad hoc interagency working group chartered in June 1981 to develop program and policy alternatives for fiscal year 1983 and beyond. That group included FEMA and DOD representation, and met frequently during the summer and fall to prepare detailed program improvement proposals for consideration in the National Security Council arena. Group meetings provided a highly satisfactory forum for free and timely exchanges of views on the appropriateness of all proposed program improvement measures.

As a direct result of these meetings, a decision was reached to increase the resources devoted to civil defense, to expand the program on a nationwide basis, and to lay the groundwork for repairing crucial deficiencies in previously proposed programs for protecting our Nation against nuclear attack. That decision was announced last October, and was subsequently codified in a national security decision directive which has replaced PD-41 as civil defense policy. Implementation of this new directive will begin with FEMA's fiscal year 1983 program.

In spring 1981, there was also created within the Office of the Deputy Under Secretary of Defense for Policy, a directorate for emergency planning. This directorate has been given responsibility for DOD oversight of the FEMA civil defense program, for coordinating all Defense Department emergency planning efforts, and for insuring compatibility between these efforts and related FEMA programs such as civil defense.

The activities of this directorate have given added vitality to already existing procedures for insuring that FEMA's planning for nuclear attack preparedness is appropriately integrated with other strategic nuclear attack planning within the Department of Defense. Such improved integration was most recently made evident in FEMA's REX 82 ALPHA readiness exercise which was run in conjunction with the Defense Department's nuclear command post exercise Ivy League. During this joint FEMA-DOD endeavor, ways and means of providing military support to civil defense under nuclear attack conditions were carefully examined, and the findings are being assessed at this time.

Similarly, incorporation of a permanent civil defense working group within the structure of the newly established interdepartmental Emergency Mobilization Preparedness Board provides another mechanism for facilitating civil defense program integration on a Cabinetwide basis.

During the entire period preceding the issuance of the new national security decision directive on civil defense, oversight consultation between FEMA, DOD, and the NSC staff on matters relating to civil defense reached an unprecedented level of adequacy and effectiveness. There is every reason to believe that this level of cooperative consultation will continue.

In conclusion, let me say that in the Defense Department's view, we now have an improved and more definitive civil defense policy, an improved program and an improved interdepartmental structure for implementing that program. We find FEMA's fiscal year 1983 proposal consistent with current nationial policy as expressed in the new NSDD, in the 1981 amendment to the Federal Civil Defense Act of 1950, and in the exhortation to improve civil defense protection for critical industries that was contained in the House-Senate conference committee's report on the Defense Department's fiscal year 1982 authorization.

We share this committee's concern for a sound civil defense program, and we are pleased to support FEMA's efforts to attain one.

Let me just add one further point, because it has become a point of controversy in public deliberation on the program. We reject categorically the argument that sometimes is heard that even the beginning of a civil defense program would lead us to a false and reckless sense of security. I don't allow my 2 year old to play with matches just because I have fire insurance, and I can assure this committee that the prudence that characterizes the administration's approach to strategic policy will in no way be diminished as a consequence of our efforts partially to mitigate the destruction that would result.

Senator WARNER. Mr. Secretary, we discussed in closed session, and I think it is important that this be brought out in open, as we have gone through an evolution of our strategic policy—namely, how we managed with the deterrent military capabilities—and the time has come where the Soviet Union could well perceive that the absence of a credible civil defense program in the United States indeed presents another gap in terms of our deterrent capabilities and that therefore the Reagan administration determined that we should begin now to close the gap or not let it widen further.

Am I correct in that?

REDUCING THRESHOLD OF NUCLEAR CONFRONTATION

Mr. PERLE. Yes, indeed. That is the thrust of the President's strategic modernization program, and this is, by the way, the first time in many years that an administration has had to face all of the dimensions of strategic modernization at one time.

The thrust of the program is to restore the stability of the strategic balance, to close those gaps which have developed. Clearly one of those gaps has been in the area of civil defense where the Soviets have a vigorous program and we have had virtually no program at all. We are concerned that this could lead a Soviet decisionmaker to believe that in the event of a deep crisis he could afford protection to the Soviet population which would be unmatched in protection to our own.

Senator WARNER. And that in and of itself would reduce the threshhold of the likelihood of a nuclear confrontation, that perception?

Mr. PERLE. You are absolutely right. The underlying premise of our whole deterrent policy is that we can reduce the likelihood of war and raise the nuclear threshold by demonstrating that no conceivable gain could result from the use of nuclear weapons, or indeed even the threat to use nuclear weapons in order to achieve political objectives. The capacity to minimize the damage that could result from nuclear war is a part of that overall deterrent policy.

Senator **Warner**. Earlier today beginning at 8:30, we have had testimony from the various intelligence components of our Government and I have extracted the following points from the classified material and made a judgment that this could go in the open.

That is that basically the Soviet Union in this coming fiscal year will be expending in excess of $2½ billion directly in the area of civil defense. That is $2½ billion has been identified as being spread over a manpower structure which is in excess of 100,000 people directly involved on a full-time basis in civil defense, the augmentation within their military units of persons directly or solely responsible for civil defense, a hardening and otherwise improvement of their military facilities to withstand nuclear attack, and then a civilian shelter program with perhaps as much as $50 million in this coming fiscal year.

Now, that $2½ billion does not include funds which are indirectly in the civil defense program, in their economy, in the factories that are being hardened. As an example of how they are preparing for survival of their basic economy and the relocation of ministers of various economies, the structure that operates, say, the coal industry, I learned this morning that the coal industry has a very active civil defense program and the minister of coal has a point of relocation which is hardened in which he and his staff can go and continue to operate the coal industry.

The training of many thousands of Soviet civilians in civil defense—that cost is not included. Much of the cost that is involved in the safekeeping and protection of the Soviet leadership is not in that figure. So $2½ billion is misleading because it is larger than this.

In the event of an alert or need to go into a heightened military posture it is my understanding that this whole structure becomes militarized, all of the way from the very top people who are full time to those that are in the civilian sector perhaps on a volunteer basis. They put on uniforms and armbands and otherwise get an authority and reporting chain that is within the military.

Mass shelters are presently in existence for the protection of upward of 12 percent of the key people in the Soviet Union, with plans to redistribute and to some extent protect the balance of the 88 percent somewhere in the Soviet Union.

In cities of more than 25,000, again, at least 12 percent are given shelter protection and the balance some other kind of protection. That is a very massive infrastructure and a substantial dedication.

The American people will want to know that with this start the Reagan administration is initiating a program. Do we intend to try and develop a parallel structure? What is your response to that?

Mr. **Perle**. Well, the program that has been requested by the administration for fiscal year 1983 does not envision the sort of extensive commitment to civil defense that we have seen in the Soviet Union for many years. I think it is important to note that we begin with essentially a zero base. We were talking about the initial planning effort that would enable us to take those relatively low-cost measures that have a significant and immediate deterrent value.

A little bit of planning before a crisis will carry you a long way when you are in a crisis, when there is no time to plan. So the emphasis is on planning. We think quite a lot can be done with the program that has been laid out.

It remains to be seen in the future how much beyond that we need to go.

Senator WARNER. An element of that is the receptivity of the American public to this initiative?

Mr. PERLE. That is right. This is not a regimented society like the Soviet Union and civil defense will only work to the extent that the public is responsive to the efforts of the Government to plan for emergency procedures.

Senator WARNER. I want to stress that point because in the classified testimony this morning we have been told that the Soviet citizens basically know exactly what they are supposed to do—almost every citizen—in the event of a military situation. A certain percentage of them have been directed to go to designated structures and the balance know basically where they are to go. So to that extent it is quite regimented.

Are there any other presentations by members of your panel?

If not, we will adjourn here for a few minutes so that FEMA can come before the subcommittee and make a presentation.

Mr. PERLE. If I could add one point that often one hears the argument made that the Soviet civil defense program is not effective; that is, it does not work as well in practice as the plans suggest and therefore in our estimate of its effectiveness we cannot only afford to ignore it, but it need not cause us to reflect on our own requirements.

I think that is fundamentally wrong. We can't know how the Soviet leadership regards the effectiveness of the Soviet program. The fact that they have a program and an extensive one, and make a significant commitment in terms of resources to that program year in and year out, seems to be the decisive fact about the Soviet program.

Whatever judgment they may have of its effectiveness is impossible to determine, but you know if I were to see any neighbor constructing an antenna on his roof in order to communicate with men on Mars, the interesting question would not be how well he is communicating with men on Mars; the interesting question would be what my neighbor thinks and what motivates him to do something, the effectiveness of which I may doubt.

With respect to the deterrence of war, we are dealing in the final analysis with a psychological phenomenon, perceptions on both sides. I know of no way to explain the Soviet investment except in terms of the perception on their part that it strengthens their position and affects the strategic balance between the United States and the Soviet Union.

So I think we have to take it very seriously. Debates about relative effectiveness seem to be quite irrelevant to what that program tells us about their perception.

Senator **Warner**. General Doyle, do you have anything further here in open session?

General **Doyle**. No.

Mr. **Alderman**. I have nothing further, Mr. Chairman.

Senator **Warner**. Thank you. The subcommittee will adjourn until 11:20.

I have spent more time than I anticipated on this subject simply because the importance is so great. So I will ask the witnesses to indulge the chairman for 20 minutes. He has a previously scheduled speech to make which will be cut to one-third, so we can return to this very important subject and not limit in any way the time required by FEMA to make their presentation.

[Whereupon, at 10:55 a.m., the subcommittee recessed, to reconvene at 11:20 a.m.]

OPEN SESSION—Continued

The subcommittee met, pursuant to notice, at 11:40 a.m., in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senator Warner.

Staff present: Frank J. Gaffney, professional staff member; Karen A. Love, staff assistant.

Also present: Robert Nichols, assistant to Senator Jackson.

Senator **Warner**. The subcommittee will be in order.

Senator Tower has set April 3 as the date we have to complete all of our hearings and as you know we had 5 days with the Williams situation and it has been difficult for us to do our other Senate business. I also had 325 farmers up here and they had a lot of questions on not only the farm program, but the budget, and I just had to speak to them. I appreciate your indulgence.

Now we will proceed and we will not be interrupted again until you have had adequate time to do your presentation.

As I stated earlier, I view this progam as of tremendous significance and I want to handle it with utmost care.

Mr. Giuffrida.

STATEMENT OF LOUIS O. GIUFFRIDA, DIRECTOR, FEDERAL EMERGENCY MANAGEMENT AGENCY, ACCOMPANIED BY LEE THOMAS, ASSOCIATE DIRECTOR FOR STATE AND LOCAL PROGRAMS AND SUPPORT, AND JOHN BRINKERHOFF, ACTING ASSOCIATE DIRECTOR FOR NATIONAL PREPAREDNESS PROGRAMS

Mr. **Giuffrida**. I am Louis Giuffrida, Director of FEMA. I appreciate this opportunity to appear before you to discuss our Nation's civil defense.

I would like to introduce two of my senior staff who are with me. At the microphone on my left is Lee Thomas, who is the Associate Director for State and Local Programs and Support, and on my right John Brinkerhoff, the Acting Associate Director for National Preparedness Programs.

Senator **Warner**. I might say that your staff has been very helpful. We have had two briefing sessions this week. I have had some insight in this program. I am grateful for the added time your staff has given to me.

Mr. GIUFFRIDA. With your permission I would like to submit my prepared statement for the record and make a brief opening statement.

I firmly believe in this civil defense program. It is an important part of our deterrent posture, helping to keep nuclear war unlikely. It stems from the basic responsibility of government to protect the lives and property of its people should a nuclear war ever occur, and in the peacetime disasters that do occur all too often.

NATIONAL SECURITY DECISION DIRECTIVE

The President has approved a national security decision directive which states that it is a matter of national priority that the United States have a civil defense program which provides for the survival of the U.S. population in the event that a nuclear war were to be thrust upon the United States.

Accordingly, the President has directed that the U.S. civil defense program accomplish these basic objectives:

First, enhance deterrence and stability, in conjunction with our strategic retaliatory and other strategic defensive forces.

Second, reduce the possibility that the United States could be coerced in time of crisis.

Third, provide for survival of a substantial portion of the U.S. population in the event of a nuclear war or nuclear attack preceded by strategic warning and for continuity of government, should deterrence and escalation control fail.

Senator WARNER. This statement that you have provided, I am trying to track it, and it is totally different from what you are coming from.

Mr. GIUFFRIDA. What I have provided is a lengthy written statement.

Senator WARNER. You are going from a long one. Do we have an extra copy of the short one?

Mr. GIUFFRIDA. It is on its way up to you right now, sir. I am now on page 2 of the shorter statement, sir.

Senator WARNER. Thank you very much.

I want to look at that Presidential direction.

Mr. GIUFFRIDA. And fourth, to provide, on a daily basis, improved ability to deal with natural and technological disasters and other large-scale domestic emergencies through appropriate dual-use of civil defense systems.

This policy complements primary U.S. reliance on strategic retaliatory nuclear forces as the preponderant factor in maintaining deterrence and peace. These policies are similar to those in Presidential Directive 41 of September 1978. They are consistent with the policies in the September 1980 amendments to the Federal Civil Defense Act, in title V and entitled "Improved Civil Defense Program".

ADMINISTRATION PROGRAM

What is fundamentally new is that this administration intends to take positive action in a moderate, orderly, and responsible way to put these policies into effect. For the first time we have a specific starting date, that is fiscal 1983, and realistic dates for achieving specific goals.

Our fiscal year 1983 request covers the major elements of an improved 7-year civil defense program for the Nation. This program is a composite of new activities, an acceleration of current activities, and a qualitative improvement of all activities. These are pulled together into a coherent whole and given impetus by the President's commitment to provide greater protection for the United States in the even of nuclear attack or other emergencies.

VIEWS ON CIVIL DEFENSE

Objections to improved civil defense have been put forward by serious, well-meaning people whose concern we all share, that a nuclear war would be horrible beyond imagination, and that its prevention must be our highest aim. We absolutely agree with that aim without reservation. To me, the most important attribute of our improved civil defense program is that it can help reduce the likelihood of ever having to use it, by enhancing deterrence.

While the American people strongly favor arms reductions and other measures which would reduce the risk of war, they also favor civil defense. No conceivable civil defense program, not even the construction of blast shelters for the 145 million people in our larger cities, could create a false sense of security among the American people. They have profound respect for the horror and devastation of nuclear war. But should a war occur, despite our best hopes and efforts, they want a chance to save themselves and their families. The commonsense and wisdom of the people should be supported by our actions.

NEED FOR CIVIL DEFENSE

Let me stress, sir, that although the chances of a nuclear war occurring are very low, and the policies and programs of this administration are intended to keep them low, the chance of war is not zero. It could occur by escalation of conventional conflict, by miscalculation or conceivably as a calculated and premeditated act by an enemy.

As President Kennedy said in 1961 and I quote:

> We have another sober responsibility, to recognize the possibilities of nuclear war in the missile age without our citizens knowing what they should do or where they should go if bombs begin to fall, would be a failure of responsibility.

We should begin meeting that responsibility today. I believe most would agree that as public servants we have the legal and moral responsibility to take those prudent steps which could substantially reduce the deaths, suffering and destruction a nuclear war would cause.

DUAL-USE IN PEACETIME EMERGENCIES

Beyond its role as a deterrent of war and protection of the population in case of attack, civil defense has many benefits for our people on a day-to-day basis. It improves the ability of our State and local governments to deal with the tornados, hurricanes, floods, and technological accidents and other peacetime emergencies which occur all too often.

Civil defense policies approved by the President require that the U.S. civil defense program improve our ability to protect life and property in peacetime emergencies. So do the dual use policies set forth in the 1980 and 1981 amendments to the Federal Civil Defense Act.

The 1981 amendments provide that civil defense assistance to the States may be used in preparing for and responding to peacetime disasters to the extent that such use, and I quote: "is consistent with, contributes to and does not detract from attack-related civil defense preparedness."

In keeping with these policies, FEMA has pursued a full range, all hazards approach including preparedness for both peacetime and attack-related disasters. This is based on the fact that at the local level there is but one set of resources for disaster response, one chief executive and one police force and one fire department and one group of physicians, hospitals, news media, and construction contractors.

The resources which respond to a tornado or earthquake are the same as those which would respond in an attack-related emergency.

The utility of civil defense systems has been demonstrated repeatedly. Trained personnel with radiological instruments have responded to incidents involving radioactive materials. Crisis relocation plans have been used when hurricanes required evacuation of coastal areas. Warning systems have alerted people of tornados and emergency broadcast stations have been used by local officials to transmit information and advice to the public.

SUMMARY

The details of our fiscal year 1983 request are covered in my written statement. The request is for $252 million. This is not a large amount, and in fact it works out to about $1.10 per capita. But its importance, I suggest, is greater than the size of the request may indicate. Like the microchip that lies at the heart of an auto-ignition system, the fiscal year 1983 request will for the first time in two decades energize this Nation's civil defense program. It will put us on the road to developing the improved protection that our people deserve and expect and that President Reagan has directed FEMA to develop.

I urge that this subcommittee consider favorably our fiscal 1983 request.

This concludes my oral statement, sir, and we would be happy to discuss the details or any other matters of interest to the subcommittee.

[The prepared statement of Mr. Giuffrida is as follows:]

PREPARED STATEMENT BY LOUIS O. GIUFFRIDA, DIRECTOR, FEDERAL EMERGENCY MANAGEMENT AGENCY

Mr. Chairman, thank you for this opportunity to appear before you to discuss our Nation's Civil Defense. In this statement I shall present this Administration's request for the Civil Defense Program for fiscal year 1983.

I want to emphasize at the outset that this is the President's Civil Defense program. President Reagan wants this program. It is an important element of his overall effort to reduce the likelihood of nuclear war.

The Civil Defense Program we are requesting is designed to accomplish several things:

It is designed to save American lives in the event of a nuclear attack by dispersing people into rural areas where they will be affected less by the blast and thermal effects of the nuclear explosions, leaving radiation as the major hazard for the dispersed population. Our goal is to double the number of Americans that would survive from a major Soviet attack on the United States.

It is designed to make nuclear war less likely by improving our ability to deter the Soviet Union from an attack on the United States. In conjunction with our strategic forces, Civil Defense will help contribute to a strong deterrent posture. It also reduces the ability of the Soviets to coerce the United States with nuclear blackmail.

It is designed also to provide an improved capability for States and localities to deal with the day-to-day emergencies that occur as a result of natural and technological hazards.

It is designed to build on capabilities already in existence, such as local police, fire, and emergency medical services organizations.

Finally, it is designed to be an integral part of President Reagan's overall program to improve the national security of the United States. The program will be compatible with and supportive of programs to provide for continuity of government and emergency communications in the event of a nuclear attack.

This Administration proposes to take action in a moderate, orderly, responsible and inexpensive way to implement a complete population protection program by the end of fiscal year 1989. We plan to progress steadily until all plans and preparations are finished. We will at the same time improve the quality of the plans which have already been developed. Once the program is in place, we will maintain the plans and systems in good working order.

Our fiscal year 1983 request outlines the major elements of an enhanced 7-year civil defense program for the Nation. This enhanced program is a composite of initiation of new activities, completion of current activities, and improvement of all activities. These are pulled together into a coherent whole and are given impetus by a Presidential commitment to save lives in the event of nuclear attack or other emergencies. Program emphasis initially is on people, plans, and communications. When these are in place, we will procure the equipment needed to complete the program. The remainder of my statement is an explanation of this program and the funds requested to support it in fiscal year 1983.

FISCAL YEAR 1983 CIVIL DEFENSE PROGRAM

Table 1 summarizes our Civil Defense Program for fiscal year 1983.

TABLE 1.—FISCAL YEAR 1983 CIVIL DEFENSE PROGRAM REQUEST

[Budget authority in millions of dollars]

Appropriation and program	Fiscal year—		
	1981 actual	1982 program	1983 request
State and local assistance appropriation	59.2	79.7	156.3
State and local assistance	40.1	50.0	66.3
Radiological defense	6.2	9.0	29.0
Nuclear attack civil preparedness	9.2	11.6	46.2
Emergency operating centers	2.8	6.5	14.9
Communications and warning	.9	2.6	
Emergency planning assistance appropriation	24.7	29.2	63.8
Research	7.8	8.7	22.0
Training and education	9.6	10.2	16.5

TABLE 1.—FISCAL YEAR 1983 CIVIL DEFENSE PROGRAM REQUEST—Continued

[Budget authority in millions of dollars]

Appropriation and program	Fiscal year— 1981 actual	1982 program	1983 request
Telecommunications and warning	7.3	10.3	25.3
Salaries and expenses appropriation	23.0	24.4	32.2
Total civil defense program category	106.9	133.3	[1] 252.3

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[1] Detail may not add due to rounding.

Table 2 shows selected Civil Defense Program outputs for the period fiscal year 1981 through fiscal year 1983.

TABLE 2.—SELECTED CIVIL DEFENSE PROGRAM OUTPUTS

	Fiscal year— 1981	1982	1983
Crisis relocation plans	790	1,200	1,700
Host area shelters identified (thousands)	941	1,130	1,530
Radiological defense support systems	200	400	752
Training exercises for local officials	200	253	948

We are requesting that the limitation on expenditures for Emergency Management Assistance in the last proviso of Section 408 of the Federal Civil Defense Act be raised from $47 million to $50 million to cover the amount requested in the fiscal year 1983 budget.

THE CONCEPT FOR POPULATION PROTECTION

The primary purpose of the Civil Defense Program is to save American lives if there should be a nuclear attack on the United States.

We do not know if there will be a nuclear attack on the United States, and we hope there never is such an attack. However, nuclear weapons do exist. The Soviet Union has nuclear weapons capable of attacking the United States. Other nations also have nuclear weapons. As long as this capability does exist, it is prudent to take some reasonable precautions against the possibility of a nuclear attack. It is better to take some precautions and not have to use them, than to need the precautions and not have them.

The Civil Defense Program for the United States is designed to be implemented upon warning of a nuclear attack. If the world situation should deteriorate, if there should be conventional fighting, if nuclear weapons should be used elsewhere in the world, the danger of a nuclear attack on the United States would increase. As the perceived level of danger increased, the people of the United States would insist on taking measures for their own survival. It is the function of the Civil Defense Program to establish in peacetime the trained personnel, the equipment, and the plans and procedures to assure that this crisis surge effort by the people is well managed and is as orderly as possible given the conditions of an imminent attack.

Our plans are designed to be implemented given some warning of an impending nuclear attack. If there is no warning, the value of our plans and systems will be decreased. We believe that there will be sufficient warning to allow the people to take the preplanned emergency actions that we have in our program. Even if we have as little as three hours warning, our program will save lives. If we have a week's warning, our program will be of significant benefit.

The thought of a nuclear attack is repugnant to our citizens, and it is difficult to sustain prolonged broad support for a civil defense program. For this reason, our concept does not demand active participation from the American people in the Civil Defense Program until there is a need—that is, until there is warning of an impending attack. We will concentrate on putting into place the programs needed to organize and control the emergency actions by the people when they themselves will feel the need.

There are five essential elements of population protection: (1) The Civil Defense Management Structure; (2) Nuclear Attack Civil Preparedness Planning; (3) Communications and Warning; (4) Emergency Instructions for the Public; and (5) Radiological Defense.

The Civil Defense Management Structure consists of over two million trained emergency managers and related emergency responders, almost all of whom currently are local employees. The State and local structure, along with a relatively small group of Federal personnel to provide overall policy guidance and program coordination, is responsible for the operation of the civil defense program. Trained emergency managers are the local and State civil defense officers, emergency management personnel, and other governmental officials who are responsible for dealing with both peacetime and wartime emergencies in their communities. It is the job of these emergency managers to plan in peacetime and to manage in wartime the Civil Defense activities at their level. The existing force of trained emergency responders—police, firefighters, emergency medical personnel, and others who work on a day-to-day basis responding to peacetime emergencies—also will be at the front lines in an attack emergency to organize and guide the actions of the people. These full-time personnel will be augmented by volunteers.

Nuclear Attack Civil Preparedness Planning is designed to give Americans a chance to survive an attack. The most effective thing we can do to protect the population is to relocate people from risk areas to host areas. Risk areas are locations which we assume would likely be targets. Risk areas are areas near military bases or key industrial facilities, or are cities over 50,000 in population. Host areas are small cities and towns and rural areas. We will have fewer casualties when our people are dispersed into rural areas, regardless of the size and composition of an attack. In order to accomplish relocation, we need plans for the orderly evacuation of the risk areas, plans for reception and care of the relocated people into the host areas, plans for distribution of food and other essential supplies to the relocated population, and fallout shelters. Our approach to fallout shelters is to survey existing structures in the Nation that either now provide adequate protection against fallout or can be upgraded in an expedient manner given some warning. Our goal is to provide access to fallout protection for each American in case of need.

Communications and Warning is essential to allow the people to take maximum advantage of warning time. Communications and warning contains three basic elements. The National Warning System (NAWAS), is designed to inform Federal, State, and local governmental agencies and their emergency managers of an impending attack. These officials warn the citizens of an attack; the system provides for almost simultaneous warning throughout the Nation. The Emergency Broadcast System (EBS) allows the President, Governors, and the other governmental officials to communicate with the people using existing broadcast stations. The Emergency Broadcast System is the primary way we plan to transmit emergency instructions to the people during the warning period. The Direction, Control and Warning System allows emergency managers to send information up and instructions and guidance down to provide for orderly management of emergency actions across the Nation. The system will provide communications linkages between and among the Federal Government, the States, and areas and localities within the States.

Emergency Instructions for the Public are prepared in advance to be acted upon when needed. The American people will want to do something if there is warning of an attack. Emergency Instructions are prepared to help assure that the public responds effectively in an emergency situation. This material is prepared in advance to be available immediately through the local emergency management structure upon the determination that conditions are such as to enter into the implementation of crisis relocation and other protective measures. Among the techniques employed is the publication of instructions in local telephone directories which are readily available to all.

Radiological Defense is designed to provide the public and emergency services personnel with a means of measuring the intensity of radiation caused by a nuclear attack and is an essential support system for nuclear civil protection and direction and control functions. Radiation is a unique and particularly frightening feature of a nuclear explosion since it can be neither seen nor felt. In order for the people in a fallout shelter to measure how well they are protected and to determine when they can emerge from their shelters after the attack, they must have a means of measuring the intensity of residual radiation. The Radiological Defense program will produce and deploy to localities the instruments and instructions to provide that capability.

The Civil Defense Program cannot provide absolute assurance to any individual that he or she will survive a nuclear attack. However, it can provide for each American a higher chance of survival than if there were no plans, no procedures, no equipment, or no emergency instructions. Once the plans and procedures, equipment, and instructions are completed for the entire Nation, and providing the people follow the emergency instructions in the warning period, the Civil Defense program we propose will undoubtedly improve the probability of survival in the event of nuclear attack.

The Civil Defense Program is funded from three Appropriations: State and Local Assistance; Emergency Planning and Assistance; and Salaries and Expenses. Included within the three appropriations are eight programs which, taken together, comprise the active Civil Defense Program.

STATE AND LOCAL ASSISTANCE APPROPRIATIONS

The portion of this apporopriation which applies to Civil Defense includes four programs: State and Local Assistance; Radiological Defense; Nuclear Attack Civil Preparedness; and Emergency Operating Centers. Much of this money passes through to State and local governments. Some funding is required to be matched by State and local monies, and some monies are used to purchase equipment which is then granted to State and local governments.

STATE AND LOCAL ASSISTANCE PROGRAM

The purpose of the State and Local Assistance Program is to create an infrastructure of Civil Defense personnel, equipment, and facilities at the State and local level. Table 3 below shows the breakout of funding requested for the State and Local Assistance Program:

TABLE 3.—STATE AND LOCAL ASSISTANCE PROGRAM [1]

[Budget authority in millions of dollars]

Program element	Fiscal year—		
	1981 actual	1982 program	1983 request
Emergency management assistance	36.9	43.9	50.0
Maintenance and services	1.4	2.3	7.0
Supporting materials	1.5	3.5	9.0
Supporting activities	.3	.3	.4
Total	40.1	50.0	66.3

[1] Detail may not add to totals due to rounding.

Emergency Management Assistance provides up to 50 percent matching funds to support eligible State and local emergency management agencies. Federal funds may be used for salaries, travel expense, and other day-to-day operating expenses of these agencies.

State and local agencies provide the essential infrastructure of trained personnel to plan in peacetime and to operate in an emergency the entire response and recovery mechanism upon which program execution depends. The program goal is to have about 8,200 trained emergency managers at the State and local level by the end of fiscal year 1987.

Maintence and Services is designed to match State and local government resources to support the recurring and maintenance costs of existing emergency communications and warning systems and emergency operating centers. Fiscal year 1982 funds provided for this program were distributed to State and local governments on a formula basis under Section 205 of the Federal Civil Defense Act of 1950 as amended; this provided for a population based distribution. For 1983 this program will be administered under section 201(i) of the Act to allow for allocations based on the expressed needs of the State and local governments. In the past, the funding level of this program has been inadequate to meet the need. Starting in fiscal year 1982, we included costs for replacement of EOC equipment and repair and maintenance of EOCs in this program rather than in the EOC program itself. We expect the fiscal year 1982 funding level of about $2.3 million to fall short of the need, as in the past. However, the increase to about $7 million for this program, which is requested for fiscal year 1983, should provide adequate funding to meet the need, including the added EOC repair and replacement initiatives.

Supporting Materials provides matching funds to States and localities to improve their local emergency communications and warning system capabilities. Emergency power generators and protection against the electromagnetic pulse effects of nuclear explosions are funded in this program. The fiscal year 1983 program is designed to support establishment of an emergency radio network within each State. Funds to upgrade the survivability and reliability of State radio networks are included in the program as are funds to establish a warning system to alert the general public of an impending attack.

Supporting Activities provides for an improved damage assessment capability at the State and local level and for a close working relationship with the American Red Cross. Damage assessment is used in the period after a nuclear attack to determine the appropriate actions to be taken to speed up the recovery process. This program will fund in fiscal year 1983 an evaluation of the damage estimation process to develop such a capability on a decentralized basis to localities. The contractual arrangement with the American Red Cross provides for a Red Cross representative at each FEMA Regional Office. The Red Cross provides valuable expertise in the development of plans and procedures for management of congregate care facilities in major emergencies. The Red Cross also provides liaison with all community-based organizations.

RADIOLOGICAL DEFENSE PROGRAM

The Radiological Defense Program provides radiation measuring instruments, trained operators (Radiological Defense Officers), support and maintenance facilities, and training material. In fiscal year 1983, we propose to add 202 full-time trained Radiological Defense Officers (RDO's), for a total of 254 fully funded officers at the end of the fiscal year. These constitute a core group which is expected to be supplemented ultimately by more than 20,000 part-time or volunteer radiological specialists. This will provide adequate coverage at the State level. We will continue to maintain the 237,000 sets of instruments deployed in the early 1960's. We will produce a pilot run of 50,000 shelter sets, which will include new, low-cost instruments estimated to cost about one-fifth of the price of the 1960's instruments when full production is achieved. The fiscal year 1983 pilot production will provide the basis for future quantity procurement of these low-cost instruments. There are two kinds of radiological defense sets. Shelter Sets include one ratemeter, two dosimeters, and one charger; these are intended for use in fallout shelters and for post-attack recovery operations. Operational Instrument Sets include two ratemeters, six dosimeters, and a charger; these are for use by emergency responders. We plan to expand the number of RADEF support systems to provide an improved capability to store and maintain the instruments to be deployed to the localities in the future.

Table 4 below shows the funding and some of the planned outputs of the Radiological Defense Program:

TABLE 4.—RADIOLOGICAL DEFENSE PROGRAM

	Fiscal year—			Goal
	1981 actual	1982 program	1983 request	
Funding (budget authority in millions of dollars)	6.2	9.0	29.0	
Outputs:				
State level RDO's	16	52	254	254
RADEF support systems	200	400	752	5,600
Operational instrument sets (thousands)	237	237	237	400
Shelter sets (thousands)			50	7,000

NUCLEAR ATTACK CIVIL PREPAREDNESS PROGRAM

The Nuclear Attack Civil Preparedness Program produces basic plans which the public would execute in the event of warning of a nuclear attack. It includes the planning for relocation during a crisis; the identification and preparation of fallout shelters; and emergency instructions for the public.

Nuclear civil protection planning provides for the development and maintenance of State and local plans to relocate people in high risk areas to host areas with lower risk in the event of warning of an impending nuclear attack. It also provides plans for use of best available fallout and blast shelters by persons in risk areas if there is insufficient warning to use the relocation plans. Crisis relocation planning is the fundamental ingredient of the Civil Defense Program. The risk areas from which the population moves and the host areas which receive the relocated people must work together. Plans for orderly movement, reception, and provision of food and other essentials must be carefully worked out in advance and kept current. Only about 26 percent of the population presently is covered by crisis relocation plans, and some of the existing plans are out-of-date. We intend to proceed systematically until there are good crisis relocation plans for every locality in the United States.

Fallout shelter preparation involves several related activities. It is necessary first to locate buildings which are suitable for shelters or can be improved in a relatively short time to provide fallout protection. It is necessary to examine each shelter carefully and to prepare a specific plan to use it and/or to upgrade its fallout protection. Many potential shelters, such as basements of public buildings, can be improved by expedient construction methods using locally available materials. However, a plan must be prepared for each shelter. Shelters already providing adequate protection need to be marked. Finally, shelters need some equipment to be of optimum use. Essential shelter stocks include ventilation kits, water containers, and sanitation kits. Our general approach to this program is to complete the survey of host area shelters in fiscal year 1984, then do the shelter upgrade planning, and finally, to procure and distribute shelter stocks. Later procurement of the shelter stocks will allow economies of scale in the procurement and ease problems of maintenance until personnel have been hired and trained and the plans completed and approved. Our goal is to have sufficient fallout shelters planned so that every American would have access to one in an emergency.

Emergency instructions for the public is a program element designed to produce and make available in advance information which the public requires to relocate to shelter in time of crisis or to take shelter in place when little or no warning is given. Much of this information will be placed in telephone directories. In fiscal year 1983, we want to add this information to telephone directories covering about 38 million Americans. Individual citizens will be able to read the written instructions provided and to follow them to assure that their relocation, preparation of fallout shelters, stay in the shelters, and emergence into the post-attack environment can be accomplished as safely as possible under the conditions. Knowing what to do may make the difference between life or death.

Individual mobilization augmentees are military reservists who augment Federal, State, and local CD activities upon mobilization. The fiscal year 1983 program includes funds for the training and travel of 1,200 of these IMA's.

Industrial protection planning provides for the identification of essential industries and key workers in risk areas who would need blast shelters to allow them to continue work if the rest of the population were relocated to host areas. The fiscal year 1983 program includes money to explore the feasibility of such an approach and to construct some prototype blast shelters in an effort to determine better the costs and optimum construction approaches. In addition, there will be considerable research and analysis performed in fiscal year 1983 to determine the feasibility and advisability of an extensive program to provide for industrial protection.

Table 5 shows the funding for the Nuclear Attack Civil Preparedness Program and some selected program outputs.

TABLE 5.—NUCLEAR ATTACK CIVIL PREPAREDNESS PROGRAM

	Fiscal year—			Goal
	1981 actual	1982 program	1983 request	
Funding (budget authority in millions of dollars): [1]				
Nuclear civil protection planning	5.5	8.1	14.3	
Shelter preparation	2.0	3.6	15.9	
Emergency instructions for the public			2.2	
Individual mobilization augmentees (IMA's)	1.7	[2] 1.7	1.8	
Industrial protection planning			12.0	
Total	9.2	11.6	46.2	
Outputs:				
Crisis relocation planners	200	205	485	
Crisis relocation plans	790	1,200	1,700	3,040
Host area shelters identified (thousands)	941	1,130	1,530	1,611
Shelters marked (thousands) [3]	97	87	103	345
Shelter upgrade plans	0	0	4	3,040

[1] Detail may not add to totals due to rounding.

[2] Funded by the Department of Defense in fiscal year 1982.

[3] Shelter marking was discontinued in 1974; it is estimated that 10 percent of existing signs deteriorate and have been removed each year.

EMERGENCY OPERATING CENTERS PROGRAM

This program provides Federal technical and operational guidance and financial assistance to State and local governments for Emergency Operating Centers (EOC's). EOC's are command posts for emergency managers. We provide 50 percent matching funds for the design and upgrading to include protective features of new and existing facilities. This includes communications, emergency power, and protection against electromagnetic pulse effects.

The goal is an effective, reliable, and survivable direction and control capability at the State and local level. We need to upgrade the EOC's to accomplish this.

In fiscal year 1983 we propose to spend about $15 million in matching funds toward achieving full operational capability for those applicants whose projects are approved. This is about twice the amount for fiscal year 1982. We will allocate these funds on a priority basis, giving consideration to the significance of each project for improving our crisis relocation capability in host areas. Our fiscal year 1983 proposal addresses only about 5 percent of the deficiencies in these EOC's. FEMA has State and local requests for fiscal year 1983 which approximate a $35 million Federal share. These estimates represent a clear indication of State and local commitment to participate in this program.

EMERGENCY PLANNING AND ASSISTANCE APPROPRIATION

The Civil Defense portion of the Emergency Planning and Assistance Appropriation provides for three important Civil Defense Programs: Research, Training and Education; and Telecommunications and Warning.

CIVIL DEFENSE RESEARCH PROGRAM

The Civil Defense Research Program provides the scientific, analytical, and technical basis for the entire Civil Defense Program. It is necessary to assure that the basic facts and relationships upon which rests the plans, policies, procedures, and procurement for civil defense are sound, well documented, and thought through properly and objectively. Defense against a nuclear attack must be accomplished with little empirical evidence upon which to base conclusions. Only two nuclear weapons have been exploded in war, and the results of weapons tests provide only a partial basis for dealing with all of the other aspects of nuclear war. A good research program, therefore, must in this instance substitute for experience which we cannot gain by experimentation.

We divide the research program into three elements: Research; Systems Integration; and Systems Development.

The Research Program Element provides for development and analysis of concepts, approaches, and techniques. The idea is to introduce new knowledge into the Civil Defense Program and to find new relationships among old knowledge. Some of the subjects included in this program element are consideration of alternative post-attack recovery strategies, methods for industrial protection, and improved methods of blast shelter construction. Also included are continued work on weapons effects, fallout prediction, and the nature of a possible nuclear attack.

Systems Integration focuses on making best use of Civil Defense resources across the entire spectrum of emergencies. This means improving current operational readiness for the nuclear attack emergency while at the same time responding to day-to-day emergencies caused by natural and technological hazards. This is a new program element for fiscal year 1983.

Systems Development is the production or revision of operational guidance which is furnished to emergency managers at State and local levels for their use in developing their own Civil Defense Programs. The products of Systems Development are manuals and handbooks, demonstrations, and field tests of the various programs. Systems Development projects are based on previous research and on field experience; they provide a link between research and the operational programs. Table 6 shows the funding for the Civil Defense Research program:

TABLE 6.—CIVIL DEFENSE RESEARCH PROGRAM FUNDING

[Budget authority in millions of dollars]

Program element	Fiscal year—		
	1981 actual	1982 program	1983 request
Research	5.0	5.8	18.1
Systems integration			.8
Systems development	2.8	2.9	3.1
Total	7.8	8.7	22.0

CIVIL DEFENSE TRAINING AND EDUCATION PROGRAM

This program prepares Federal, State and local officials, their staffs, and the public to meet the responsibilities and challenges of Civil Defense. The training and education program is divided into three program elements: Civil Preparedness Training; the National Emergency Training Center; and Emergency Public Information.

Civil Preparedness Training is aimed at providing instruction to Civil Defense personnel at all levels. The training courses cover the entire range of Civil Defense programs and are to be given to such audiences as: State and local elected officials; emergency managers and planners; emergency services personnel; radiological defense officers; shelter managers; and private citizens who are involved in the Civil Defense program. Delivery of the training is accomplished in three ways. Certain specialized courses are taught to a limited number of personnel at the National Emergency Training Center (NETC) at Emmitsburg, Maryland. Some personnel receive instruction on a regional basis. A large number of personnel receive their training through their own State and local emergency management staffs. In the latter case, the role of FEMA is to train the trainers. Providing training and the related instructional material for potential instructors increases many fold the number of people that can be reached with this training.

The National Emergency Training Center program element reflects the resources required for the faculty and administration components of this important educational facility.

Emergency public information is a new program element in fiscal year 1983. The intent of this program element is to provide materials for acquainting the public with the Civil Defense program in peacetime, but particularly during a period of tension in which the probability of a nuclear attack is increased without an actual attack warning.

Table 7 below reflects the funding and selected outputs for the Training and Education Program.

TABLE 7.—CIVIL DEFENSE TRAINING AND EDUCATION PROGRAM

[Budget authority in millions of dollars]

	Fiscal year—			Goals
	1981 actual	1982 program	1983 request	
Funding	9.6	10.2	16.5	
Outputs (cumulative trained personnel):				
Shelter manager officer/instructors (thousands)	0	0	1.5	20.0
Radiological defense officers (thousands)	7.1	8.3	9.1	22.0
Radiological instructors (thousands)	4.5	5.0	5.5	7.5
Radiological monitors (thousands)	178.0	179.0	187.0	625.0
Exercises for local officials (annually)	200.0	253.0	948.0	3,040.0

TELECOMMUNICATIONS AND WARNING PROGRAM

There are three primary elements of the Civil Defense Telecommunications and Warning Program: The National Warning System (NAWAS); the Emergency Broadcast System; and the Federal Direction and Control System. The NAWAS system and the Federal Direction and Control System are dependent on commercial telephone lines. Many of the State and local emergency communications and warning systems also are dependent on commercial telephone lines. Although the existing communications and warning system works well in peacetime, it is vulnerable to the effects of a nuclear attack and would not be useful during or after an attack.

Our efforts in the Telecommunications and Warning Program for the next several years will be to replace the old system with a new one which will survive a nuclear attack and provide an operational capability throughout the emergency. A nuclear attack could disrupt communications. In this event, the ability of government at all levels to communicate with other governmental activities and with the public would be degraded severely. Lack of ability to warn and to communicate could cripple our efforts to manage response and recovery activities.

We plan to create a more survivable telecommunications and warning system by using radio as the primary means of communications. High-frequency radios protected against the electromagnetic pulse effect of nuclear weapons and provided with an independent source of electrical power have the capability to operate during and after an attack, provided they are not hit directly by a nuclear weapon. This continuous communications capability is an essential feature of the Civil Defense Program.

As we perform the research and planning necessary to put into place a new system based on radio, we will continue to operate the existing system. Much of the equipment used in the current system will continue to be useful in the new system.

FEMA is responsible for providing a link from the FEMA Regions to the States. We plan to provide each State with high-frequency radio capability in fiscal year 1984 and fiscal year 1985. We also will provide State and local governments with technical assistance and policy guidance. In addition, FEMA provides financial and technical assistance to commercial broadcast stations which participate in the Emergency Broadcast System; the financial support is for the purchase and installation of emergency power and for protection against the effects of a nuclear weapon, such as electromagnetic pulse and fallout.

Introduction and extensive use of high-frequency radio is the first step in the overall improvement program. As equipment and funds become available, we will introduce satellite communications, low-frequency radio, and meteor burst technology to provide an element of redundancy in the system. The use of more than one form of radio communications will improve the reliability of the overall system in emergencies.

Table 8 below shows the funding for the three major elements of the Telecommunications and Warning Program:

TABLE 8.—TELECOMMUNICATIONS AND WARNING PROGRAM FUNDING [1]

[Budget authority in millions of dollars]

Program element	Fiscal year—		
	1981 actual	1982 program	1983 request
National warning system [2]	4.6	6.3	7.1
Emergency broadcast system [3]	(.9)	(2.6)	8.1
Direction and control system	2.6	3.9	8.3
T & W planning and analysis		.3	1.7
Total	7.3	10.3	25.3

[1] Detail may not add to totals due to rounding.

[2] Includes the Washington area warning system and the decision information distribution system.

[3] Funding for EBS was included in the State and local assistance program for 1981 and fiscal year 1982; memo entries are shown for comparison purposes.

SALARIES AND EXPENSES APPROPRIATION

The Civil Defense portion of the Salaries and Expenses Appropriation pays for employees of FEMA who work in the Civil Defense Program. Most of these are full-time employees, but a relatively small number of part-timers, consultants, and experts also will be used as appropriate. Table 9 below shows the proposed staffing for the Civil Defense program:

TABLE 9.—CIVIL DEFENSE PERSONNEL IN FEMA

	Fiscal year—		
	1981 actual	1982 program	1983 request
Permanent positions	610	582	687
FEMA headquarters	181	177	204
FEMA regions	429	[1] 405	[1] 483

[1] Additional part-time personnel to conduct the shelter survey program are funded in the State and local assistance appropriation; this amounts to 60 work-years in fiscal year 1982 and 95 work-years in fiscal year 1983.

PEACETIME USE OF CIVIL DEFENSE

Beyond its role in deterrence of war and protection of the population in case of attack, civil defense has benefits for our people on a day-to-day basis. Civil defense improves the ability of State and local governments to deal with the tornadoes, hurricanes, floods, technological accidents, and other peacetime emergencies which occur all too often. The civil defense program approved by the President will improve our ability to protect life and property in peacetime emergencies. Exercising Civil Defense systems on a frequent, day-to-day basis for peacetime emergencies will improve the capability of the systems to respond to nuclear attack.

FEMA is building a single system to respond to the full spectrum of emergencies from peacetime disasters to a nuclear attack. At the local level there is one set of emergency management resources. There is one police force, one fire department, one government, and one group of physicians, hospitals, news media, and construction contractors. Resources which respond to a tornado or an earthquake also would respond in an attack-related emergency.

The utility of civil defense plans and systems for peacetime emergencies has been demonstrated repeatedly. Trained personnel with radiological instruments have responded to incidents involving radioactive materials. Crisis relocation plans have been used when hurricane threats required evacuation of coastal areas. Warning systems have alerted people to tornadoes. Emergency broadcast system stations have been used by local officials to transmit emergency information to the public. Table 10 shows our estimate of the utility of the civil defense program for emergencies other than a nuclear attack.

TABLE 10.—PEACETIME UTILITY OF CIVIL DEFENSE PROGRAMS

Selected civil defense programs	Natural disasters [1]	Technological disasters [2]	Nuclear accident [3]	Terrorist incident [4]
State and local CD staffs	Essential	Essential	Essential	Essential.
Radiological defense	None	Limited [5]	do	None.
Crisis relocation plans	Moderate [6]	Moderate	do	Moderate.
Fallout sheltering plans	None	None	Substantial	None.
Fallout shelter stocks	Low	Low	Low	Low.
Research	Moderate	Moderate	Moderate	Moderate.
Emergency operating centers	Essential	Essential	Essential	Essential.
National warning system	Substantial	Substantial	Substantial	Substantial.
Emergency broadcast system	Essential	Essential	Essential	Essential.
Training and exercises	do	do	do	do.

[1] Includes hurricane, tornadoes, floods, earthquakes.

[2] Includes hazardous material spills, fires, and dam failures.

[3] Includes both accidents and terrorist incidents involving nuclear plants or weapons.

[4] Excludes nuclear terrorist incidents.

[5] Radiation meters are useful in spills involving radioactive materials.

[6] Substantial value in earthquake and hurricanes.

THE OUTLOOK FOR CIVIL DEFENSE

The outlook for Civil Defense is good. Government leaders at all levels whose responsibility it is to provide for the common defense know that Civil Defense is essential in this age of uncertainty. This Administration is embarking on a complete, but reasonable, Civil Defense program to protect the population of the United States against the possibility of a nuclear attack. We are asking this year and will ask in future years for sufficient money to do the job for the entire Nation. Although previous administrations have talked about Civil Defense, and some have even advocated Civil Defense, none have applied the necessary money and effort. President Reagan means to get the job done.

We are providing new life to a program which has been in a caretaker status for a number of years. Funding in recent years has been level or declining in real purchasing power and has been sufficient only to keep the program barely going. Many of the previous plans and preparations have become outdated. We know that. We are ready and willing to correct the mistakes and omissions of the past. Since January of 1981 we have been working hard to improve our understanding of how to provide Civil Defense and how to formulate a useful program.

We believe we have developed a workable program which can be accomplished through incremental increases in funding. During fiscal year 1982, we are concentrating on preparing the foundation for future expansion with a budget inherited from the previous Administration. Our goal in fiscal year 1983 is to increase dramatically our ability to plan and improve civil defense plans and procedures at the State and local level. We shall request sufficient funding in fiscal years 1984 through 1989 to complete the task of putting into place a Civil Defense Program for population protection which covers all of the United States. Thereafter, the Nation can concentrate on maintaining and updating the system which will have been put into place.

Our strategy in bringing this Civil Defense program to completion is to concentrate first on people and later on things. We want to emphasize early achievement of a large, competent, and well trained staff of CD workers at the Federal, State and local level. We will stress the completion of plans and support systems for crisis relocation. We want to finish the task of locating and preparing plans for expedient upgrading of fallout shelters. When we have the people and the plans in place, we will undertake the procurement of the supplies and equipment necessary to finish the job. We want to make certain that we have at all times a program which could provide maximum benefit if we were to have to use it before we have done everything we want to do.

Mr. Chairman, that completes my statement in support of the Civil Defense Program. I ask your approval of this program, which deserves the support of all Americans, regardless of political party or persuasion. War is an evil thing, but it has happened, is happening, and could happen again. Those who advocate an effective Civil Defense Program do not thereby approve of war or exhibit a desire for war of any kind. On the contrary, efforts to increase the Civil Defense capability of the Nation demonstrate a clear respect for the cruel realities of nuclear war and reflect a desire to mitigate its harsh consequences for mankind.

PROGRAM COMPONENTS

Senator WARNER. Could we take a sector of America such as a big city as a focal point and just describe basically what you would hope to do over the 7-year program that you have? Perhaps we could take a sector of this city and the environs around and tell me what you hope to do?

Mr. GIUFFRIDA. We can take such a sector and with your approval I will pass that to the associate director of State and local programs in whose area that particular portion of our program falls, Mr. Lee Thomas.

Mr. THOMAS. Senator, as you know, there are a number of components to the civil defense program. The majority of those components are to provide assistance to local governments to develop their capability to respond in a war-related situation or peacetime emergency.

Those components include, for instance, direction and control components, so in the Washington area, let us say the Metropolitan Washington area, we will be working with both the D.C. Government as well as the surrounding governments and the States of those surrounding governments to develop emergency operating capability with survivable communications so that leadership will be able to direct operations.

We will be able to communicate both on a local level, regional level, and a national level with other leaders who are directing operations. We also will include in that direction and control capability access to the emergency broadcast system. Now the emergency broadcast system, as I am sure you know, is that system that is available both for local officials, State officials, and the President to provide emergency instructions to the public.

As a part of that program we will be protecting and providing protection to designated private broadcast stations in their area. Now, that protection includes protection from electromagnetic pulse as well as 24-hour capability, so those stations would be able to broadcast in the surrounding area.

A major component of the program that we will be working on for this area will be our nuclear protection program that includes crisis relocation. We will be developing a specific crisis relocation plan both for the risk area as well as for the host areas surrounding Washington.

In that regard we will develop within Washington both inplace protection plans and relocation plans. We will be surveying potential shelter sites in the city for determination as to what inplace protection is available from blast effects in case we do not have sufficient warning to relocate the majority of the population.

We will be developing specific plans for relocating the population based on the assumption there will be a crisis period when we will have an opportunity to relocate the population. Designating particular host areas in surrounding counties, sectors of Washington population will be given detailed plans for relocating to specific host areas in surrounding counties and States.

Within each of the host areas there will be a detailed plan developed which will include both direction and control, reception, congregate care capabilities, feeding, and medical supplies for the population during the crisis period.

Additionally, within the host areas, and within the risk area, we will develop an overall radiological defense plan, which will be used both during the crisis period and during an attack and postattack recovery period, for determination of the dangers of radiation.

MAJOR ELEMENTS

There are any number of components to the program over the next 7 years that would impact on the Washington area. They break down, I would say, pretty well into three different elements. The first is planning elements, which include relocation plans, inplace protection plans, direction and control plans, and radiological defense plans. Then there are the systems that will be used to support those plans, such as the radiological defense system, Emergency Broadcast System, our communications capabilities, and the actual equipment that will be placed in the host areas for radiological defense, for the support of the population in sheltering situations. Finally there is the training and public education that is so important for the people who will carry out those systems, the emergency management personnel, the full-time people relating to civil defense as well as the emergency responders, the vast majority of the people actually called upon to respond in time of crisis.

Mr. **Giuffrida**. I would add to that, as you see, it flows logically from what Mr. Perle said earlier about planning, training, education, and information that would be prepared in advance, and crisis information, that is the term that we use, that would be available to be provided to the people in the United States as required.

Senator **Warner**. My concern is that we don't unduly raise the expectation of the American people that we are able to provide a degree of survivability, and you are conscious of that.

Mr. **Giuffrida**. I am conscious of that. As a matter of fact, my instructions to my staff from the day we started working on this program were that we have to be particularly sensitive to that, that the program is of such crucial importance to the Nation, that it demands that we not pretend we can provide something that we are unable to deliver, that we acknowledge that we will still have questions to ask.

The ultimate objective is to provide to the people the service that the Government is supposed to provide and that is protection of life and property in time of stress.

What we are trying to build, Senator, is a predictable effective response that is understood not only by the governing echelons at various levels, but also by the public.

SOVIET CIVIL DEFENSE

Senator **Warner**. In our earlier session this morning, we started in, as you may know, at 8:30 and two of your colleagues were here so they covered that aspect of the hearing.

The first mission of the Soviet civil defense program is to maintain the control of the Communist Party and in that context to control military operations, the economic structure and it seems to me lifesaving may be down as one of the lower priorities, whereas lifesaving in your program is the highest priority.

Would that be correct?

Mr. **Giuffrida**. Yes; if I may——

Senator **Warner**. This is apart from the steps that we are taking to preserve what we call the leadership here in the United States and ability to maintain command and control, the C^3 area which is highly classified.

Mr. **Giuffrida**. I think in every decision the United States faces, when they are seeking a solution, they must apply not one criterion, but rather two. For instance, the solution needs to be more than simply effectiveness. It must always be acceptable, acceptable within the traditional American definition of individual freedom and of responsibility to one's Nation.

Senator **Warner**. That is a very important point and I stressed that with Secretary Perle, that this new program of the President as it begins to evolve over the next 7 years, is dependent upon a very high degree of acceptability by the American public.

Mr. **Giuffrida**. Absolutely.

Senator **Warner**. There is a good deal of voluntarism in this situation.

Mr. **Giuffrida**. And a lot of it cranked into our program.

Senator **Warner**. That is in contrast to the Soviet program where there are already 115,000 people fully devoted to civil defense, and perhaps you have heard the figures of $2½ billion investment and that doesn't include several other important categories that haven't been costed out.

Also this program has an element of fairness to the totality of American citizens whereas in the Soviet system certain select groups, and I am talking about as much as 10 or 12 percent apparently are given some priority treatment over and above others. That will not be found with us.

CIVIL DEFENSE IN 1960'S

Let me go through a great collection of notes that I made earlier today. I think we should address, General, the earlier initiative in this country on civil defense. You quoted President Kennedy, in 1961, and all of us have some recollection of earlier attempts here in the United States to implement a civil defense program and as we know as a matter of history it lapsed.

What has changed in your judgment to require the revitalization of this program, and why did the earlier one fail?

Mr. **Giuffrida**. Senator, I, too, go back and I have a very clear recollection of my own involvement as a Marine officer in World War II and those years that preceded it for us in 1939 and 1940.

I would suggest a careful reconstruction of the American attitude in those days when we were talking civil defense, when the American people were convinced that there was in fact a credible threat to the security of the United States, and when the civil defense program and all of the other national preparedness programs took off quickly.

In my judgment, the degrading of the interest in the program over the years flowed from the people's belief that we were no longer vulnerable to an attack upon the United States. I think that the degrading of interest in civil defense programs was accelerated by the "assured destruction" policy that you discussed so knowledgeably earlier this morning where we were supposed to be vulnerable because that in itself would make us no longer need the program.

However, as you know from your years of involvement in this committee, the Soviets did not really believe that.

I think that the President correctly has identified that deterrence and national preparedness can no longer be measured solely in terms of a military establishment. Rather, it should be measured in terms of a military establishment which is properly staffed and equipped but also supported by a protected population that has critical skills—also by strategic materials and vital industries. We need a supportive public which has been brought by our peculiar and productive American techniques to understand that there is in fact a national problem which demands a national solution.

Senator **Warner**. You remember well the flurry of shelter building that occurred in the sixties, and the stories that emanated about the safekeeping and storage of food supplies. How does your program differ from what we had in prior years?

Mr. **Giuffrida**. Well, to note one important difference, Senator, our program does not propose to start actual stocking until we are further down the road and have gone back and reviewed all of those lessons of the sixties, not all of which were bad, sir, as you know. There were some good points that were proven there, and there were some that were obviously ineffective.

So our program proposes to go back and review those lessons, and not just to rehash old programs. We propose to see what we need to derive from that experience and then develop the programs later down the road for stocking shelters with minimum essential supplies.

Mr. **Thomas**. Probably a major element is the relocation that I talked about when we were discussing the Washington area. The earlier programs were primarily aimed at protecting the people in place. A major element today relates to relocation capability.

INDUSTRIAL PREPAREDNESS

Senator **Warner**. Let us go back to this issue of fairness. One of the areas of your program is the element of defense preparedness, perhaps for key industries and personnel.

Could you comment on that? There is quite a substantial figure on that.

Mr. **Giuffrida**. It is not totally descriptive to call that defense preparedness if that denotes exclusive interest in protecting those who produce war goods. That portion of the program addresses industries and workers which are essential to keep the civilian side of the Nation going also. It is in fact across the whole spectrum of national requirements.

COMPARISON WITH PROGRAM "D-PRIME"

Senator **Warner**. How does this program differ from the D-prime program that FEMA has heretofore been working with for a number of years?

Mr. **Giuffrida**. I am going to ask Mr. Brinkerhoff to answer that.

Mr. **Brinkerhoff**. This is very similar to the "D-prime" program, where there was a basic emphasis on getting the people away from where the nuclear weapons are expected to hit. However, it differs a little bit in timing and in emphasis.

Mr. **Giuffrida**. Also this program puts a great deal more emphasis on communications and on exhaustive planning than did the earlier program.

Senator **Warner**. Well now, to focus on the credibility of the program which has been proposed, our rough calculation here for the 7-year cycle anticipates requests to the Congress of perhaps as much as $4 billion?

Mr. **Giuffrida**. That is correct, sir. Over 7 years, $4.2 billion is the calculation that I have.

Senator **Warner**. One of the questions that very properly is going to arise as this program is assessed by the American public, is that this is but a small fraction of the investment that the Soviet Union is making and we must provide an answer for that lack of facilities.

Mr. GIUFFRIDA. I think you addressed that a little earlier with one of the previous witnesses. It was never our intent to clone the Soviet system. They work under different circumstances than ours, and well beyond that.

Mr. BRINKERHOFF. I think the Soviet system is more ambitious than what we propose. What we propose essentially is to move the bulk of the population out of the risk areas, where we expect the Soviets would logically attack, and get them into the rural areas where they have a higher probability of surviving the direct effects of the nuclear weapons, the blast and fire and initial radiation.

Then we have to protect those people from fallout or residual radiation. We can do that, and a large number of those people that are relocated will survive.

The Soviets have gone into extensive construction of blast shelters. We heard that they have provided blast shelters in their risk areas for some 12 percent of the population in the cities over 25,000 population. We at the moment do not have that as a goal.

Our goal is to provide a potential of fallout shelter protection for each American in the host areas, which are less dangerous than the target areas.

Senator WARNER. That is a very important point.

Thank you.

Mr. GIUFFRIDA. Well, traditionally the United States has depended upon its technological skill and planning skills and this program is attempting to capitalize on that.

One of the things we did when we reorganized FEMA for this organization was to establish a Directorate for State and Local Programs and Support. We have in fact been very diligently pushing all of our programs in the direction of involving the States and localities. So what we are saying in this program is that we capitalize on our national experience; to do better planning we bring in the people who must ultimately put the program into operation, in the States and localities, and I think we can do that.

Senator WARNER. Well, we come back to the thrust of the Soviet system. As I analyze it here, it is not only for the protection of the rigid party control over their citizenry, but a continuous operation of their military, of their whole government and of their economy. It is a massive undertaking. That partially explains their very heavy investment.

Gentlemen, I wonder if you would remain where you are and we could invite to join the panel Ms. Giles, who is a past president of the Civil Defense Council in the State of Virginia, to give her perspective as one of the many American volunteers that are essential to the success of this program.

We welcome you, Ms. Giles. I made the acquaintance of this witness when she was here in Washington at a symposium of civil defense leaders from all over the United States.

We are delighted to have you here today.

STATEMENT OF G. JEANNE GILES, CIVIL DEFENSE/EMERGENCY SERVICES COORDINATOR, TOWN OF ASHLAND, VA., PAST PRESIDENT, VIRGINIA CIVIL DEFENSE ASSOCIATION, CURRENT VICE PRESIDENT, U.S. CIVIL DEFENSE COUNCIL, REGION III

Ms. GILES. Mr. Chairman, we sincerely appreciate the opportunity to appear before the subcommittee on behalf of local government civil defense coordinators and directors. In this statement, I shall present our support for the administration's request for the civil defense program for fiscal year 1983.

All of us at the local government level believe in a civil defense program, and for years have tried to carry out that program without direction and guidance from the Federal level. President Reagan has gone on record supporting civil defense and through the competent ability of General Giuffrida and the Federal Emergency Management Agency, we are beginning to experience some definitive direction in the program, such as those steps outlined in the 7-year comprehensive civil defense program for our Nation.

LOCAL GOVERNMENT ROLE

The functions of the Civil Defense program is to establish in peacetime, trained personnel, equipment, and plans and procedures. The most essential part of the program is trained personnel. The personnel are we, the local coordinators and directors at the local level.

Local government level has the ultimate responsibility of implementing the national civil defense program, through continuity of government; utilizing assets and resources; response, command and control, by building on capabilities already in existence such as local police, fire, and emergency medical services.

The equipment, plans and procedures are only as effective as the trained personnel who implement the emergency operations procedures by utilizing all local government resources and available equipment. Of course, up to date, workable equipment would be more desirable and effective, but for years we have had to make do with the best we had.

We support crisis relocation as the most cost-effective method of protecting lives, but again, the burden for implementing will rest at the local government level as does the responsibility of warning the public once the National Warning System [NAWAS] is alerted.

In fact, as General Giuffrida has stated in his written statement: "State and local government agencies provide the essential infrastructure of trained personnel * * * upon which the civil defense program execution depends."

SUPPORT FOR STATE AND LOCAL CIVIL DEFENSE OFFICES

We, at the local level, respectfully request that this subcommittee take a close look at the program and the budget outlined by General Giuffrida and especially State and local assistance [EMA].

We have been committed to a civil defense program for years, but unfortunately in previous years have been overlooked by the Federal budget process. The increase proposed in 1983, while it appears to be substantial, still leaves a deficit at the State and local level.

Virginia, for example, because of no increase in 1981, and only a slight increase in 1982, still has a 23.3-percent deficit. All of the other States are experiencing similar deficits. Even the 1983 proposed EMA budget reflects no margin for growth, but it is a good beginning to bring the civil defense program into light.

Senator WARNER. How do you break that deficit up?

Ms. GILES. Most of the time we do not, Senator, we work with what we have, and sometimes the State contributes. Virginia does not, but some of the States do contribute.

Senator WARNER. That brings up another point, General. As I make an analysis of this 7-year plan, over $3 billion of the $4 billion works its way into the State structure, is that right?

Mr. GIUFFRIDA. That is essentially correct.

Senator WARNER. Are we looking for any financial contributions from the States?

Mr. GIUFFRIDA. Senator, we anticipated your interest which is very appropriate in this, and I have asked Mr. Thomas to prepare a couple more details.

Senator WARNER. Forgive me for interrupting your statement, but you touched on a point that I frankly had overlooked as we proceeded here this morning.

FEDERAL FINANCIAL ASSISTANCE

Mr. THOMAS. There are several components that do call for support of State and local governments. For instance, particularly with the dual use provisions which are so important to the State and local governments, the emergency management funds, which Ms. Giles has been discussing, are funds that are provided on a 50-50 matching basis to State and local governments.

We requested and Congress approved in fiscal year 1982 approximately a 15-percent increase in those funds and as a part of the request for next year, we requested another 15-percent increase in those funds, to be matched by increases at the State and local level and as Ms. Giles has pointed out, a number of local units of government are overmatching those funds at this point.

In addition to those fundings, the other matching fund program is primarily a development program for emergency operating centers. The emergency operating center, as you know, is the heart of the emergency operations in any peacetime emergency and would be for a wartime emergency.

The majority of the remainder of the programs are 100 percent funded, for example, the crisis relocation planners.

Senator WARNER. Is that 100 percent federally funded?

Mr. THOMAS. Yes; and the maintenance and calibration personnel for the radiological defense equipment, as well as providing the equipment itself. The radiological defense officers, those are State personnel, funded 100 percent with Federal funds. But, in the area of emergency management personnel, the EMA money, and in the area of the emergency operating centers and communications and warning systems, we are talking about 50-50 matching programs that State and local units of government see as very necessary programs for dual use.

Senator WARNER. Thank you.

Ms. Giles, would you continue now.

CIVIL DEFENSE RESPONSIBILITY OF GOVERNMENT

Ms. GILES. The first duty of government is to protect its citizens. Nuclear war is a reasonable possibility and a carefully planned and responsive civil defense program can save lives. The civil defense program is not geared to any specific interest group, but provides equal protection to all citizens—rich and poor, young and elderly, conservatives and liberals, labor and industry.

Senator WARNER. I would like to ask you to rethink that phrase of nuclear war as a reasonable possibility. It seems to me that beyond our prayers on this subject is a feeling that it is something that we have to plan for, but it is a highly unlikely thing.

Can we clarify this?

Ms. GILES. I caught it myself after it was typed, but did not have time to change it.

Senator WARNER. You are willing to change it?

Ms. GILES. I can say it is a possibility, take out the reasonable, and leave it as a possibility.

Senator WARNER. Well, we cannot eliminate it from our planning, but I don't think this is phrased correctly here.

Mr. GIUFFRIDA. I was going to emphasize, Senator, that I think every rational person worldwide should be devoting all of their energies to preventing nuclear war, but I come back to the point that we do not have an absolute assurance that this country will never need this program and one continues to be infinitely greater than zero.

Senator WARNER. I think that is well expressed and we have a responsibility to officials at the Federal and State levels and every citizen, to do our level best to prevent nuclear war, and one of the very purposes of this program is to close this gap which appears to be opening and the Soviets might perceive this as an additive to the question of vulnerability.

Ms. GILES. I would like to leave with you an important message that we hear quite often:

> For a nation to survive as a nation it is essential that a substantial number of its citizens survive and are able to function. This is impossible without civil defense. It is not enough that we merely have shelters for key members of the government. Government without citizenry is no longer a government * * *

Mr. Chairman, this completes my statement in support of the civil defense program. On behalf of the Commonwealth of Virginia, and the U.S. Civil Defense Council, we respectfully request your approval of this program. It is difficult to express the importance of this program in such a short period of time, but if you should have any questions, we will try to respond with the help of General Giuffrida.

Senator WARNER. I think your experience can be very beneficial. First, how many years have you been involved?

Ms. GILES. Five years.

Senator WARNER. And not only with the State, but I presume as a past president that you have associated with a number of other persons of similar responsibility, presidents and otherwise, nationwide?

Ms. GILES. Yes, sir.

VOLUNTARISM IN CIVIL DEFENSE

Senator WARNER. It is my perception that this is a very dedicated group, all volunteers, and not paid, is that correct?

Ms. GILES. Some of us are paid at local government level, but only on a part-time basis and there are very few full-time employed people.

Senator WARNER. It is a very modest pay?

Ms. GILES. Most of the staff that we use at the local level are volunteers.

Senator WARNER. That is the point I want to stress, and the General alluded to it, but let us get your perception.

The success of the President's program is going to be dependent upon a high degree of voluntarism across the Nation, and as an individual who has dedicated 5 years of your life to this, do you think that that is a reasonable expectation as we in the Congress consider the appropriation of this money, the authorization for it? Can we anticipate that there will be this, should we say volunteer basis in the United States?

Ms. GILES. Yes; I think so. We depend upon it at the local level every day. We see people calling us and wanting to participate in the program. It is a very reasonable expectation, and these people are dedicated to it just as we are, and maybe more so because they are strictly volunteers.

FEMA RELATIONS WITH STATE AND LOCAL OFFICES

Senator WARNER. That is important to stress, I think.

What is your experience on the degree to which FEMA, both the present organization and the past, works closely and effectively with the States and local organizations?

Ms. GILES. The FEMA, as it is now, is most effective. I have never had any trouble with their work. They have given us, at the local level, what we have not seen in many years. This present organization gives us believability because they work with us and we have a feeling that they care about their program very much. It helps us to do our job a little better, when we see somebody upstairs who cares, and goes to bat for us.

Senator WARNER. General, I have one last question.

Can you assure the committee that funds for attack-related civil defense preparedness that are applied through the dual use provision, are, in accordance with the law, fully consistent with and supportive of attack-related civil defense preparedness?

Mr. GIUFFRIDA. Yes.

Senator WARNER. This has been a most unusual chapter in the hearings schedule of this subcommittee, and I think we have expended close to 3 hours on this important subject, in contrast to previous years where I think, maybe, 15 minutes or 30 minutes was devoted to it.

I certainly am going to try my level best to work with you to see that the Congress, that is the Senate, fully appreciates the importance of this new initiative by the President and that money is obtained for the purposes set forth by the President.

I think that each of you have, and particularly you, Ms. Giles, who is here at her own expense and time, and I am sure the current president——

Ms. GILES. This is Ms. Westenbury. She is the current president of the Virginia Civil Defense.

Senator WARNER. You can expect next year, to be before this committee as a witness, and you can start to prepare your statement now.

Ms. WESTENBURY. Thank you.

Mr. GIUFFRIDA. Thank you, Senator.

Senator WARNER. We will adjourn.

[Whereupon, at 12:30 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

WEDNESDAY, MARCH 17, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

MX WARHEAD (ABRV)

The subcommittee met in executive session at 2:15 p.m., pursuant to notice, in room 212, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner and Tsongas.

Staff present: Frank J. Gaffney, Patrick L. Renehan, and James C. Smith, professional staff members; Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater, Jim Dykstra, assistant to Senator Cohen, and Arnold Punaro, assistant to Senator Nunn.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. The subcommittee will be in order.

We will start the closed session at this point, and we welcome the Senator from Massachusetts, Senator Tsongas and, Senator, if you want to ask questions, we will be glad to have you do so.

One of the aspects of the strategic force modernization program put forth by President Reagan that has been the subject of particular controversy and public and congressional scrutiny has been the decision of the Reagan administration to employ the advanced ballistic reentry vehicle system on the MX missile.

Because of the technical nature of this decision and the complex factors that contribute to it, the Chair feels it is essential that an opportunity be provided to the committee, and to the Senate as a whole, for a full and frank discussion of the selection of the MX warhead.

In this connection, we have asked those individuals directly involved in the selection process and those bearing responsibility for the studies and analyses supporting it to appear before us at this time. Dr. James Wade, Principal Deputy Under Secretary of Defense for Research, Development, and Engineering, and Dr. Richard Wagner, Assistant Secretary of Defense for Atomic Energy, will comment on the rationale behind the administration's determination that the ABRV was preferable to the Mark-12A.

Representatives from the Air Force and the Department of Energy are also available to discuss considerations that bear on the decision as seen from their respective points of view.

Following the session with the Office of the Secretary of Defense, Air Force, and Department of Energy witnesses, the subcommittee will complete its review of this issue with testimony from Dr. Batzel, director of the Lawrence Livermore Laboratory and Dr. Kerr, director of the Los Alamos National Laboratory. They have been asked to discuss the technical aspects of the two weapons designs and to assess for the subcommittee the uncertainties and risks associated with each.

We recognize that they were not directly involved in the selection of the ABRV over the MK-12A and that their fields of expertise do not necessarily encompass all of the system characteristics associated with the MX that may have been involved in that decision.

Nonetheless, we feel that their views on this subject may be helpful to the subcommittee's deliberations and we look forward to hearing their candid comments.

We will now turn to our good friend, colleague and adviser, Secretary Wade.

Mr. Secretary, we are delighted to see you and your colleagues here. I know you are putting in a lot of hours and we thank you. Mr. Secretary?

STATEMENT OF DR. JAMES P. WADE, JR., PRINCIPAL DEPUTY UNDER SECRETARY OF DEFENSE (RESEARCH AND ENGINEERING), ACCOMPANIED BY DR. RICHARD WAGNER, ASSISTANT SECRETARY OF DEFENSE FOR ATOMIC ENERGY; BRIG. GEN. DOYLE, GSP GROUP, AND BRIG. GEN. McCARTHY AND MAJ. ROBERT RAKER

Dr. **Wade**. Let me introduce the DOD members.

On my right is Dr. Wagner, Assistant Secretary of Defense for Atomic Energy. On my far left, Brigadier General Doyle, who is from the JSTPS. Also Brigadier General McCarthy from Gen. Kelly Burke's office, and to my left is Maj. Robert Raker, who will talk to you on the effectiveness of these two warheads.

Senator **Warner**. We will recognize that Gen. Kelly Burke is ill and otherwise he would be present, but he is well represented.

Dr. **Wade**. It is, as always, an honor to appear before you to testify concerning one facet of the administration's strategic modernization program—the prospective warhead for the MX missile.

As you know, the administration's fiscal 1983 budget request and fiscal 1982 supplemental include funding for an ABRV warhead, rather, than a Mark-12A for the MX missile. The administration believes this is a sound decision technically, fiscally, and strategically, and I would now like to place our decision in context.

One of the important management reforms of this administration has been to reinject planning into the planning, programing, and budget process. As the members of this committee well know, we have too often in the past paid only lip service to planning, and our PPBS process has in fact been in the main a programing and budgeting process only.

IMPROVED PLANNING

Starting last spring, Secretary Weinberger and Deputy Secretary Carlucci undertook a significant series of steps designed to improve our planning ability to increase the attention that we pay to planning. What do we mean by planning? Several things: First, we mean looking at Defense resource issues in a broad mission area perspective; second, we mean looking beyond the near term, extending our horizon a decade or more into the future; third, we mean better integration of the acquisition process and the planning, programing, and budgeting system; fourth, and most important we mean looking at the threat and at how our programs will fare in the face of probable or potential Soviet counteractions. This type of comprehensive planning is, of course, nothing new. The military has been doing it for years. What is different about this administration is our conscious attempt to pay more attention to this planning function and give it more weight in translating national objectives into specific budgets.

In the past, the commanders of the Unified and Specified Commands have looked to the future and have suggested what they needed. But we have given insufficient weight to these recommendations and instead have allowed ourselves to be captive of a green-eye-shade mentality which judges things on their near term cost rather than their long-term relevance.

I do not wish to imply that the Reagan administration has eliminated the inherent tension between the military or civilian planner and the budgeter. That tension will always exist since prudent military planners will always seek zero risk forces and prudent fiscal planners will always seek ways of holding down the total cost of defense.

What I do wish to suggest is that the Secretary of Defense, who must balance competing military and fiscal pressures, has directed his senior staff to pay more attention to comprehensive planning as a way to insure that we are, in fact, spending our constrained budget wisely. This, in turn, means that the Secretary and his senior staff sometimes are at odds with individual services who are forced, by the very nature of the system, to be exceptionally concerned with their own service's budget and with the near term.

ABRV DECISION

How does this pertain to the ABRV decision, First, let me note that both the present and the immediate past Commander-in-Chief of the Stratetic Air Command strongly support ABRV as the warhead for the MX missile. Similar support has been expressed to me personally by senior Air Force planners when they were speaking in a fiscally unconstrained context. Despite this, it is no secret to this committee that the Air Force felt—in a fiscally constrained environment—compelled to recommend the Mark-12A for MX. The Air Force was driven to this decision by legitimate differences of opinion over the value of the increased effectiveness of ABRV. concern over schedules but especially by the need to hold down service budgets, especially in the near years.

But the Secretary of Defense and his senior staff must look beyond a service perspective. Indeed, they must look beyond a Department of Defense perspective to broad national objectives and the total national cost of any given weapons system. In so doing, the Secretary and his senior staff, came to the conclusion that the judgment of the Commander of the Strategic Air Command was correct, and the ABRV should be provided for MX.

I might note, parenthetically, that I believe that this is but one indication of a growing intent within the Office of the Secretary of Defense to pay more attention to specific recommendations from the commanders of the Unified and Specified Commands. We believe that we must consider carefully the views of those who are responsible for actually employing systems which we procure.

Let me turn now to the specific reasons, from a broad perspective, which led the Secretary of Defense to conclude that it was in the national interest to provide the ABRV as the MX warhead.

Four considerations are relevant:

MILITARY EFFECTIVENESS

Against the spectrum of targets we may have to engage in time of war, the ABRV is the superior weapon. It has better accuracy, better hardening to nuclear effects and better all-weather performance. We have the option, with no additional testing, to deploy the ABRV with a yield of [deleted] thus providing both added capability against super hardened targets and a hedge against unforeseen future problems with system accuracy. There can be legitimate disagreement over how much all this added capability is worth; but in my judgment there can be no question that the ABRV is markedly superior to the Mark-12A.

SAFETY

The inclusion of insensitive high explosive, along with various other features, makes the ABRV a safer warhead than the current Mark-12A. Safety is always important of course; but I believe it is especially significant for the MX. While we are a year away from selecting the final deployment mode, two of the candidates—the continuous patrol aircraft and defended deceptive basing—may involve frequent movement of MX missiles. This is a significant departure from our past practices with respect to ICBM's. The Congress has—in my judgment correctly—been strong supporters of improvements in the safety and security of our nuclear weapons. That policy is wise, in any event and it is especially wise in the case of the MX missile.

SPECIAL NUCLEAR MATERIAL

As compared to the Mark-12A, the ABRV is a far more efficient user of special nuclear materials, specifically oralloy. For 100 MX missiles, and assuming a yield of [deleted] for the warhead, selecting ABRV instead of the Mark-12A will save [deleted] oralloy which would cost almost [deleted] to produce.

DIVERSITY

For over 20 years a fundamental principle of the design of the strategic forces has been the principle of diversity. We maintain the three legs of the Triad, among other reasons, to guard against an unforeseen vulnerability with any single leg. It is also important to consider diversity in warhead design within a particular leg of the Triad. It is impossible to foresee the political conditions, strategic conditions, and arms control policies of the future. Many thoughtful people, including many of your congressional colleagues, advocate a cessation of nuclear testing. It is not my purpose this morning to discuss the merits of that proposal; nonetheless, we must consider the possibility that at some time in the future we will determine such a step to be in our national interest. It will be particularly important should this occur to insure that we have not put all our eggs in a single basket, that is, that we do not depend for the effectiveness of our forces on any single warhead no matter how well designed and thoroughly tested.

We have carried this general principle into effect in the other legs of the Triad. Our air-breathing leg will have both B-61 and B-83 strategic bombs as well as the W-80 warhead on ALCM. At sea, Poseidon missiles carry the W-68 warhead while Trident I missiles carry the W-76, and, in all probability, Trident II missiles will carry yet a different warhead.

These variations are partly due to the requirement to engage different types of targets for which different types of weapons are appropriate. But they also result from our concern that we not be in the position where an unforeseen catastrophic failure of one warhead design can endanger the effectiveness of an entire force. For this reason, it would be unwise to program MX to carry the same warhead as is presently carried by the bulk of the Minuteman force.

I should stress that I do not expect our warheads to fail nor do I wish to suggest that the Mark-12A and its W-78 warhead is not a well designed and thoroughly tested weapon. My point is that the survival of the United States depends on the effectiveness of our strategic forces and it is an error to place that survival in the hands of any single system or any single warhead.

These four considerations led the Secretary of Defense to include funding for ABRV within the fiscal year 1983 budget.

Senator WARNER. We would have in our inventory another warhead, thoroughly tested, and that would give us a greater degree of deterrent. Is that what you are saying?

Dr. WADE. Yes, sir. In making that decision, the Secretary was conscious of the importance of cost. He carefully considered the fact that substituting ABRV for the Mark-12A will add about $880 million, in constant fiscal year 1982 dollars, to the Air Force program. But were we to retain the Mark-12A, we would feel compelled to provide an improved fuse; and, for the safety reasons I outlined earlier, to modify the warhead by adding insensitive high explosive.

These modifications would add about $259 million, also in constant fiscal year 1982 dollars, to the basic Air Force Mark-12A program. When he considered this cost along with the potential savings resulting from the ABRVs more efficient use of oralloy, and when he examined the issue from the standpoint of the total cost to the taxpayer, not just the impact on the DOD budget, the Secretary of Defense concluded that ABRV was the proper warhead for MX.

The Secretary of Defense was also aware of the argument made by some that the Mark-12A was a proven, tested design while the ABRV has been under development for over 5 years and has been successfully flight tested three times. While the Mark-12A is a fully tested design, the safety and fusing modifications I referred to earlier would necessitate additional testing. Thus, from this standpoint the Secretary of Defense concluded that the systems were equivalent. There was a third—and in many ways more difficult—consideration. As you know, this administration places great reliance on competition.

We are therefore anxious to keep the maximum number of technically competent industrial teams working in this defense area. We are sensitive to the concern expressed by many that the selection of ABRV could force one reentry system contractor out of the business.

But the benefit to the Nation of maintaining a capability in individual defense contractors is only one of the considerations that must be taken into account. Thus, while we hope that a decision to select ABRV will not result in a permanent loss of technical competence and capability in the defense industrial base, that consideration cannot be allowed to override the clear advantages that ABRV offers.

In his recent recommendations on the JCS system, the Chairman of the Joint Chiefs of Staff has stressed the need to pay more attention to the Commanders of the Unified and Specified Commands and their assessments of their requirements. In the case of ABRV, the Secretary of Defense has elected to do just that. Secretary Weinberger concluded that the improved effectiveness, enhanced safety, reduced special nuclear material, and diversity that the ABRV provides justify its selection despite any short term budgetary consideration. We believe the Secretary's decision was a prudent and wise one and we urge this committee and Congress to support it.

Thank you.

Senator WARNER. Dr. Wade, that is a very well reasoned document, and a good position paper. I compliment you.

Are there others on the panel who want to give statements at this time?

Dr. WADE. I think we have short statements from each member at the table.

Senator WARNER. The argument has been framed very clearly in my mind. Is this additive material or further explanation?

Dr. WAGNER. I agree further with what Dr. Wade has said about this decision. I believe that the management basis for this decision is one of providing prudent hedges against unforeseeable circumstances that could develop in the future.

For an issue that is as important as the effectiveness of our strategic deterrent, I think you have to go with some hedges. Those hedges are a capability to handle the situation where the accuracy of the missile system in question, the MX missile system, does not meet the expectations.

I don't think we have any evidence that it will not meet the expectations. However, there is one aspect of that equation that is outside of the control of United States and that is the hardness of the target. We know the Soviet Union has had a major program to harden their military targets during the last decade and we know that they spent a lot of effort in understanding how to harden them.

I would expect that trend to continue. That is a matter that is beyond our control. I think this capability to achieve a higher yield in this RV is a hedge against that development.

The other kind of hedge that I think is absolutely essential to build in is the hedge against a comprehensive test ban or some other additional limitation on testing which over the long term strongly suggests that it is prudent to add to the diversity of our systems. We have had experiences in the nuclear weapons stockpile in the past in which unforeseen difficulties have arisen.

I think that there is no reason to suspect that there is such a difficulty that would arise with the Mark-12A, and I concur in the argument that it is today a fully qualified system. However, this is a difficult art, the design of nuclear weapons, and we have had occurrences in the past where things have come up that certainly could not have been anticipated. If such a thing occurred in the future and we could not test our way out of it, I think it is essential to have a backup position. I believe it is a prudent position.

Senator WARNER. Let's go back to your very valid point on accuracy.

ACCURACY

Accuracy in terms of destroying the target is really two things: One is CEP and the other is yield. It has a higher yield, and what about that CEP?

Dr. WAGNER. The MX system accuracy, if you assume, as I think must be done, that the Mark-12A would have the improved fuse, is nearly the same for the two cases—it is about a wash. I think it might be appropriate now for the Air Force to show a chart or two that show how the effectiveness of the system is affected by degradations in the accuracy.

Would it be appropriate now to show that?

Senator WARNER. I have just one or two more fundamental questions.

Is that sort of a uniform opinion on the panel, on accuracy, that both warheads will offer roughly equivalent CEPs?

Dr. WAGNER. Given the new fuse for the 12A—yes.

Dr. WADE. I think, Mr. Chairman, that the 5-minute briefing which Major Raker will present will put this question in proper perspective.

Senator WARNER. All right, let's go.

ABRV AND MK-12A—RV CANDIDATES FOR MX

Major **Raker**. Last year many pieces of information about the ABRV and the MK-12A were circulated in the Pentagon and this analysis was undertaken at that time to see if we could get at the bottom of these issues.

The objective of the study was to evaluate the differences in military effectiveness between the MK-12A and ABRV and to evaluate special nuclear materials: impacts and usage of either RV.

The study evaluated an MX force configured with either 10 or 12 reentry vehicles of either type.

[Chart deleted.]

Chart 3 addresses military effectiveness as a function of yield and accuracy. Displayed on the vertical axis are the number of Soviet installations not destroyed, and on the horizontal axis a range of missile accuracy—Circular Error Probable (CEP).

There are three yields on the chart, [deleted].

Now, these are the number of installations in the target base, against which these three weapon yields, at the specific CEP's, cannot achieve a [deleted] probability of damage. In other words, these weapons are arriving and detonating in the vicinity of the installations and at least [deleted] of the targeted installations are destroyed. At a CEP of SFRD [deleted.] I measure the number of installations destroyed between [deleted] and things are extremely close. This chart makes another point which is: There is very little difference in the performance between [deleted] weapons across an accuracy spectrum of [deleted]. The other point is that if, for some reason, MX accuracy isn't [deleted] ABRV's potential for greater yield of [deleted] destroys more targets. At [deleted] there is a difference between [deleted] installations that [deleted] will destroy and [deleted] will not destroy.

If MX accuracy is [deleted] the difference in the number of targets destroyed between yields is in the neighborhood of [deleted] targets. This chart displays how additional yield maintains military effectiveness as accuracy degrades.

[Chart deleted.]

The ABRV, with a thermonuclear yield of [deleted] Kt, is a heavier weapon than the Mark-12A. When these weapons are flown aboard the MX missile we find the ABRV does not have as much range and does not have the target coverage of the MK-12A. ABRV, doesn't go as far or footprint as well as the MK-12A. But the question we need to ask is, how important is the difference between the performance of the heavier ABRV than the MK-12A. This is the target base, broken up into [deleted] different installation categories; the tops of these bars indicate the total number of installations targetable within each of these [deleted] categories.

Dr. **Wagner**. You might want to define what [deleted] is.

Major **Raker**. Yes sir. Perhaps an example would illustrate what I'm referring to. For instance [deleted].

This slide displays the target base segregated into [deleted] targeting categories. A share of the target base has been extracted and set aside for bomber targets [deleted] installations are represented which are partitioned into [deleted] categories. These categories are:

[Deleted.]

I didn't allow any RV's to be thrown away. The MX inventory in an MPS basing system, Great Basin deployment area, was [deleted] boosters each deployed with 12 ABRV. I was able to assure the targeting efficiency was 100 percent up through [deleted] targets. The chart displays the target coverage achieved by these [deleted] (diagonally hatched area of each category).

If I attempted to conduct targeting of these MX in the clear area of the [deleted] categories my MX was less than 100 percent efficient. However, there are other ballistic missile systems for use in coverage of these targets.

I conclude from this chart that I don't have a major range or footprint problem differential between the two RV's. When I flew the other cases of 10 ABRV's and 10 MK-12A's, I was able to use all [deleted] MX. I don't know where the stopping point is beyond [deleted].

[Chart deleted.]

This chart displays the supply of oralloy [deleted] and the oralloy demand for a 200 MX force deployed with either 10 MK-12A or 10 ABRV (each at high or low thermonuclear yield). The oralloy requirements for MX are added to all other nuclear weapon oralloy requirements.

The [deleted] ABRV is the only RV option for a 200 MX deployment that [deleted]. The different oralloy requirements equate to costs to the U.S taxpayer [deleted]. Oralloy hasn't been produced since 1965.

I observe from the analysis that the high yield ABRV at [deleted].

There were no problems targeting any booster configuration analyzed.

Finally, deployment of any RV other than the [deleted].

That concludes my briefing.

Mr. WARNER. I have a general question of Dr. Wade, and I just wonder if you could cover it.

NUCLEAR DETERRENCE

As we move toward our new philosophy of nuclear deterrence, namely, our retaliatory steps are being oriented more and more forward meeting surgical and hard target kill requirements, this weapon is an enhancement and the chart shows it?

Dr. WADE. Yes, sir, not only enhancement, but I believe the MX with this particular front end is a vital part of the total system program.

Senator WARNER. In keeping with the new philosophy away from mass destruction, it is more or less for use against point targets?

Dr. WADE. Yes. And I think more importantly, it provides for the first time a capability which we hope will move the Soviets toward shifting their current ICBM deployment into a more survivable mode. To do so they could spend on the order of $30 billion on survivability, which does not add additional offense system risk to this country.

It is similar to the comment I made earlier about our bomber program, which could force the Soviets to spend more than $100 billion for defense. That type expenditure does not place additional Americans at risk in any way. Our whole strategic program is designed to drive them in that direction.

Senator WARNER. Senator Tsongas.

Do you have a question?

Senator TSONGAS. I am interested in that latter point. The difference would cause them to do what, in terms of the ABRV?

THE SOVIET WEAPON PROGRAMS

Dr. WADE. What we are hoping to do Senator, is move the Soviet weapon programs in a direction which further enhances stability, by forcing them to move toward more survivable systems. That costs them money, and that type of expenditure——

Senator TSONGAS. A more survivable system, you say?

Dr. WADE. Yes.

Senator TSONGAS. I didn't get that.

Senator WARNER. I am particularly impressed with your remarks on safety. I just had a trip down through the laboratories, and I have become increasingly concerned about the safety of our existing weapons and the issued insenstive high explosive. It is just a factor of almost 100.

Have you tried to quantify it at all?

Dr. WADE. I should let the lab directors talk in detail about this. For example, if you have an accident where an airplane crashes, the probability for plutonium scatter from a detonation is minimized and in a very significant way.

Senator WARNER. Particularly as we move from the fixed base silo system to perhaps the alternatives of a patrol aircraft, safety becomes an added concern?

Dr. WADE. Yes, sir.

Senator WARNER. Now, it is interesting on page 7, as you point out the need to retrofit the MK-12A to give it capabilities comparable to those of the ABRV. Is it an accurate calculation taking the $259 million and subtracting it from the $881 million, is that the net cost in your judgment?

Dr. WADE. In order to add an improved fuse to the Mark 12A, that adds about $259 million.

Senator WARNER. Is that on top of the $259 million?

Dr. WADE. No; the $259 million is the best number that we have for this one element at this time. The effective accuracy of the RV with the fuze is about [deleted]. Remember, we can save on the order of [deleted] in oralloy; and, with additional missile deployments it could reach [deleted]. That isn't a cost to the Department of Defense, but it is a cost to the taxpayer. In our judgment as far as total cost is concerned, it is a push between these two warheads.

Senator WARNER. I probably have the figures here and I haven't had a chance to run these down. I am trying to rebut the argument that the ABRV is going to cost $880 million more, but I judge that already takes into consideration the retrofit of what we need to do in the Mark-12A program.

Dr. WADE. No.

Senator WARNER. That is a net figure?

Dr. Wade. No. That is the incremental cost to the baseline Mark-12A program, which did not contain the upgraded fuze.

Let me go through it one more time. If you have to improve the Mark-12A——

Senator Warner. You are equivocating that decision, if we have to do that, you mean?

Dr. Wade. We will not be taking this action if the ABRV is the warhead decision.

Senator Warner. That is the point. If you do the ABRV you don't do the retrofit work on the 12A?

Dr. Wade. Yes, sir.

Senator Warner. And, therefore, is $880 million the net increase, taking into consideration that you don't do the retrofit?

Dr. Wade. The added cost for the DOD.

Senator Warner. You have to look at it the other way. If you don't do the ABRV you have to do the 12A. It is the difference, and that was we should look at in terms of the taxpayer.

Dr. Wade. Yes. From a DOD point of view, we considered the net cost to be $881 million minus $259 million—that is $622 million—because we believed that an upgraded fuze would have been essential had we selected the Mark-12A.

Senator Tsongas. My arithmetic is a little different.

Dr. Wade. That is the correct DOD figure. However, if we stay at [deleted] for the ABRV, the net cost to the taxpayer in going to the ABRV at [deleted] is on the order of [deleted] because of the savings of nuclear material that will be realized.

Senator Warner. That you added. That is one of the principal arguments in this case.

Why don't we have your two colleagues provide their testimony now?

General McCarthy. I don't have a prepared statement. We are ready to answer your questions. In the case of the question you just asked, I am quite familiar with those as the special assistant from MX.

SPECIAL NUCLEAR MATERIAL

Senator Warner. Could you put in perspective for the committee consideration given to special nuclear material consumption when making the decision?

Dr. Wade. The importance of savings on special nuclear material, Mr. Chairman, is an important issue when you look at the total nuclear material requirements we have vis-a-vis our other programs.

One example I offer is the importance of protecting the option of deploying an ABM system, as part of the MX. We at this time do not have within our stockpile memorandum that requirement firmly protected to include the needed special nuclear material.

If our ABM program were to become one element of our long-term basing solution, then we will have to find additional SNM. So the aspect here of saving this oralloy as part of the ABRV decision is an important aspect of our need to conserve one of the nuclear materials for which we project a shortfall.

We have other programs where we can see shortfalls occurring over time. One is the 155 artillery AFAP system. That system could eat up a great deal of plutonium down stream. We are truly at the margin in the sense of meeting our requirements in the context of all special nuclear materials.

This is an important consideration; and again it costs money. We are talking here with the ABRV to the possible savings on the order of [deleted] and even higher if the MX deployment ends up in the outyear on the order of 200 missiles.

Senator WARNER. That raises the next question. How would your estimate change if it went to 200 missiles?

Dr. WADE. That is based on the assumption of 100 missiles. There is a [deleted] savings, and if the ultimate decision were to go to 200, the savings would double. Savings would be on the order of [deleted]. That is not a small number. But it is not a DOD cost but that is a taxpayer cost.

Senator WARNER. Do you regard the ABRV lower use of oralloy as being critical?

Dr. WADE. No, sir, not at all. The important point in our consideration on the ABRV is that there is not one factor that I raised in my statement that is overriding by itself. It is the combination of the four pieces that together makes that decision very sound, both in a technical and in a military sense.

Senator WARNER. Dr. Wade, as we examine the overall military budget, we cannot perceive where possible cuts might come, if they were effected on the floor of the Senate. But let's hypothetically consider if the Congress were to cause a change of the IOC, would you recommend the ABRV contract then be applied competitively instead of sole source?

Dr. WADE. Mr. Chairman, this committee and those of us in front of you believe that what we are trying to do is to close the window of vulnerability and close it as fast as we can. The MX weapons program is very important toward closing that window, and closing it fast. We prefer not to encourage thinking toward the consequences of not making the system 1986 IOC. I would rather pursue with full vigor our need in maintaining that IOC, as it is being planned today.

Senator WARNER. How much of the current program will be a sole source procurement?

General MCCARTHY. I think it is premature for us to judge exactly what part. I can tell you that our approach to it is to minimize the sole source requirements. We have some initial figures on production but because we are still in the process of negotiating those I would prefer not to use those figures in this testimony, but they represent only a small portion of approximately $1 billion. Then your costs we have talked about. We are trying to break the program into various segments to insure to the greatest degree possible within the scheduled constraints, that there is maximum use of all the resources we have in the country capable of producing this type of thing, and also from the philosophy that competition will tend to keep the price down.

Dr. WADE. May I add to that, Mr. Chairman. There was indeed competition for the ABRV several years ago and that competition as you are probably aware was won by Avco; but, I think it is important that we recognize the vital contribution the GE defense team, is making, for the American people, over the past 20 years. As we look to the future, for example to the program that we are now assembling for the D-5 program, our interest would be to maintain the reentry vehicle expertise that we now have across the country, at GE, at Lockheed, at Avco. We are currently preparing a strategy to work toward pulling together a national DOD reentry vehicle R&D program in order to maintain that base across the country.

Competition is needed; and the ABRV competition, as far as the R&D program, was won by Avco. Nevertheless, GE has performed tremendously for this country in the past and toward this recognized expertise we are serious in our regard toward structuring a program to keep this total and needed national defense base together as well as we can.

General McCarthy. I have addressed only the development part of it. On the procurement part of this, we would like to compete the leader-follower portion, which would permit more than one company the opportunity to participate in overali production.

IMPROVED ACCURACY OF MX SYSTEM

Senator Warner. General Doyle, how much importance do you attach to the ability to acquire a greater yield in the new improved accuracy of the MX system?

General Doyle. Mr. Chairman, I can talk to you from the perspective of the military capabilities planning that is done at JSTPS, and the data base that we are talking about. I have not up to this point had the opportunity to participate in the technical analysis of this issue, and I would defer to Dr. Wade on those particulars, but perhaps a comment about the hardness of the data base would be useful.

I begin by saying that I certainly support the briefing numbers that I just saw. You might, to refresh yourself, find it is of some interest today in our national target base we are looking at in excess of some [deleted] in the Soviet Union only and I am not talking about anywhere else now.

The rate of increase of that number of installations over the last 4 or 5 years has been steady. It also has through the intelligence community had the character changed in some regard, and the character invariably has been an increase in hardness.

My suggestion to you on the bottom line is that from a targeting perspective we are looking at a base not only in the Soviet Union but in East Europe that is increasingly hard in individual numbers and also is becoming increasingly dispersed. This is a reality that is a very significant aspect of our current capability.

Senator Warner. Indeed it is.

Senator Tsongas. You said there were [deleted] in being [deleted].

Now many of these are in non-weapons targets? I would assume you are talking about their land based missile system and their civil defense structure for their command.

General Doyle. All of those I am talking about are installations that are objective to the national policy of this country. They are all targetable. I am not talking about that [deleted]. So I am not talking about that number at all. These are all objectives.

Senator TSONGAS. I realize that is true, but what I am trying to do is figure out what the breakdown of that [deleted] would be.

General DOYLE. About [deleted].

Senator TSONGAS. I assume that the latter category of industrial targets would be the most difficult to harden, is that right? That is, by the sheer size of the installation.

General DOYLE. Absolutely.

MARK-12A MEGATONNAGE

Senator WARNER. I would like to have the record reflect the three warheads that we are looking at, we are looking at the current Mark-12A in terms of its megatonnage which I understand is [deleted] and what is the weight of that?

Then we are looking for the new system, the alternatives, [deleted] and I understand that there is no weight differential there between those two, is that correct?

Dr. WADE. Yes, sir, that is correct.

Senator WARNER. Let's get those figures and explanation in the record as to why there is no weight difference. I think I know but I want it in the record.

Dr. WADE. I will do that.

Senator WARNER. Can you articulate it now, or do you want to supplement the record later?

Dr. WADE. The base line Mark-12A weight is [deleted] pounds and the ABRV is [deleted] pounds.

General MCCARTHY. Mr. Chairman, the IHE revision brings that up to [deleted] pounds for the Mark-12A.

Senator WARNER. If we do those mods it is [deleted].

General MCCARTHY. That is correct.

Senator WARNER. What is the megatonnage of those two warheads?

Dr. WADE. For the Mark-12A it is [deleted]. The yield stays the same. For the ABRV the base line planning number is [deleted] with the option to deploy the weapon at a yield of [deleted].

Senator WARNER. How do you get [deleted] without the addition of weight?

Dr. WADE. It is just a question of trading orolloy for deplete uranium.

Senator WARNER. It is just that simple?

Dr. WADE. Yes.

Senator WARNER. Now, General McCarthy, a document is being circulated suggesting that the Air Force was made to do this program; and it is quite a strong statement. It argued that the system had no significant advantage from a military point of view. Do you agree with that?

General MCCARTHY. I believe that would be a misstatement of the Air Force position. The Air Force concerns in supporting the Mark-12A with the W-78 were principally based on cost and schedule. We were concerned that within the budget that had been allocated for MX there was not sufficient funding provided for the development of the ABRV and the time that we made those statements to OSD we did not find a way to make the schedule compatible with the MX.

In the course of that dialog between the Air Force and OSD we were able to work the money problem, getting it added into the funding level after the judgment was made that it was worth it.

Second, there were a number of things that occurred that affected the schedules so that it lined up with an acceptable level of risk.

After those principal arguments were made, the Air Force has supported that position.

Senator WARNER. Well, your office is familiar with this document that is being circulated?

General McCARTHY. I can't see the document.

Senator WARNER. We will provide it to you because we seem to have a disconnect between what is in the document and what you just stated, and so I would like you to take a look at it.

General McCARTHY. May I ask the date of that document?

Senator WARNER. I don't think it is dated. We will pass it down to you.

General Doyle, there has been some confusion as to the attitude of the Strategic Air Command and the Joint Strategic planning staff, as to the desirability of requiring additional Mark-12A's with the remaining missiles now equipped with 12A systems.

One of the tradeoffs associated with the acquiring of additional warheads is to consider it from a targeter's point of view.

General DOYLE. I am not prepared to answer that question. I apologize.

Senator WARNER. You can put it in the record.

General DOYLE. Yes, sir.

[The information follows:]

ADDITIONAL MARK-12A WARHEADS

[Deleted].

General McCARTHY. I have had an opportunity to look at this particular document you are referring to. It appears to me to be a draft document of a proposal developed by an action officer of arguments that could be made to support continuing the Mark-12A. To my knowledge this document was not appoved by the Air Force and was not submitted to OSD.

Senator WARNER. That clarifies it. I wonder how we got it in our possession?

General McCARTHY. I do not mean to say that some of the arguments made in the document are not valid.

Senator WARNER. I am trying to find out where it came from.

I would like to ask General Doyle, do you believe it is the Soviets intent to invest in additional hardening of their land-based ICBM's?

General DOYLE. The land-based ICBM force, you mean?

Senator WARNER. And perhaps they are seeking to do this.

General DOYLE. Well, the land-based ICBM force, as you know, sir, has been undergoing modernization over the last several years, and I suspect the intelligence community has made it very clear to you that there indeed has been a very large investment on the part of the Soviets in that regard.

With regard to command control and communications, the proliferation that we have seen, I would principally say within the last 2 years maybe even a little longer, but certainly over the last 2 years a proliferation hardened command and control facility above ground and below ground and bunkered and buried antennas have displayed to us a degree of redundancy and echeloning and total commitment on their part as to give us in JSTPS serious pause as to how we are going to be able to meet the required objectives as stated within our current capabilities.

That commitment appears to be ongoing in construction activities throughout the Soviet Union and elsewhere, I might add, as well.

Senator **WARNER**. I intend to wait for the laboratory director, unless you have some questions.

Senator **TSONGAS**. I have been spending some time on this and I came prepared to make a certain case but I think that they have made a good presentation. I appreciate the courtesy of the Chairman.

Senator **WARNER**. If the lab directors will now come forward we will proceed.

REENTRY VEHICLE DIVERSITY

Dr. **WADE**. May I just conclude with one additional comment?

In reference to our discussion on reentry vehicle diversity, it is interesting to look at what the Soviets are doing in this area. I would like to point out that the Soviets in their development and acquisition of their new missile systems, we see up to [deleted] different reentry vehicles being developed for each major system. Now, they don't complete through acquisition this number, but they do spend substantial efforts here finishing at least engineering development and placing many on the shelf. So this example of Soviet diversity, their heavy attention to R. & D. in the area of reentry bodies, certainly dwarfs what we are doing today.

Senator **WARNER**. We will have the next panel.

But first I want to clarify something. I wonder if General McCarthy would take the stand again.

When I asked the question earlier, and I repeat the question, a document is being circulated which is purported to be an official Air Force reclama made to the DOD which was quite strong and argues that the system has had no significant advantages from a military point of view.

I understand your answer to be that this document which I thought was the reclama turns out not to be an official document but is instead, being passed around as such on Capitol Hill by certain individuals.

You have examined this document and confirm that it is not the official Department of the Air Force reclama.

General **MCCARTHY**. That is correct. There was a draft preparation of a reclama that was never sent out by the Air Force and therefore there is no reclama. That represents, just looking at it very quickly, the first cut at the action officer level of what we ought to say in a reclama sent and therefore the OSD never rejected it, as the heading on that document suggests.

Senator WARNER. So that this document which we really haven't been able to designate other than it bears the title "This Air Force Reclama to PBD-220C was rejected by OSD."

This has no official status whatsoever?

General McCARTHY. My judgment is that that is correct, sir. Now, as I pointed out previously in my testimony, some of the arguments that are made in that piece of paper are similar to the discussions that we had as we tried to represent our position on that, and the military effectiveness arguments were presented by Major Raker.

I don't think that there is anything new to present in that argument about military that has not already been discussed.

Senator WARNER. I think that we have it clarified now. It was never a formal reclama and now we know that for a fact, and this document is spurious, and now the record is therefore clear.

Without objection, I will insert an opening statement by Senator John Heinz. He had hoped to attend this hearing. Additional questions for the record will also be inserted for the record.

[Statement referred to and questions for the record follow:]

STATEMENT BY SENATOR JOHN HEINZ, A REPRESENTATIVE FROM PENNSYLVANIA

Mr. Chairman, I come before you today because I believe that the Department of Defense is about to embark upon a project that will cost the taxpayers of America perhaps more than a billion dollars and produce no significant increase in our nation's security. What we have here is a classic example of what happens when generals at the Pentagon think they have a blank check.

The issue is the abandoning of the Mark-12A warhead for the Minuteman III missiles and replacing it with ABRV.

Even the Department of Defense will admit that this new warhead will cost the Nation at least $600 million and other experts, outside of DOD say that cost is really $1 billion.

Mr. Chairman, I know you share my opinion that our Nation's defense must be second to none, that defending America is our top concern. But America is also in a severe economic crisis. The President wants to increase defense expenditures, and there are many and indeed a growing number in the Congress that thinks this level of defense spending may be too high. There are many improvements our military needs and must have to do their job. Why, why, should we spend up to a billion dollars on a new warhead that just very marginally increases our ability to destroy enemy targets. The money could be better spent on more needed defense improvements or used as a savings to reduce our horrendous budget deficit.

As I have examined the issues of Mark-12A versus ABRV over these past several months, I have become very concerned about the Defense Department's change in direction as to the selection of the re-entry vehicle for the MX Program.

As this Committee is well aware, the Air Force prudently selected the Mark-12A vehicle in 1978 as the preferred MX baseline. The rationale for their selection was very clear and straightforward. The Mark-12A meets all of the MX specifications and requirements. No new design and development work is required. No additional expenditures for these areas are needed. The demonstrated performance, with over 400 successful flight tests and zero failures, is outstanding. Cost and weight parameters are well known and any schedule risk for the MX program does not exist.

Now, Mr. Chairman, when the Office of the Secretary of Defense, unilaterly directed a change to the ABRV technology vehicle, they have increased the cost of the MX program and to the tax payers by $600 million by OSD estimates and over one billion by the qualified experts. They have also introduced serious schedule and technical risk, in the September 1986 MX IOC.

The Mark-12A, Mr. Chairman, based on Air Force, OMB, a Department of Defense Consultant, and Contractor Analyses, proves to be of equal effectiveness in killing enemy targets. They both do the job and with equal amounts of strategic nuclear material. There are no savings at all of critical nuclear material to offset the one-billion dollar ABRV gold plated price tag.

The Mark-12A is perfectly capable of carrying either a warhead designed by Lawrence Livermore or a warhead designed by Los Alamos. If warhead redundancy is of concern, then the Mark-12A could carry either of these warheads.

In the area of safety, the safety features such as the Insensitive High Explosive (IHE) are planned for either the Mark-12A or the ABRV.

The Mark-12A is also the baseline RV for the Navy Trident II system. If ABRV is directed, the Navy will be left high and dry and require additional money, over the one-billion dollars for ABRV, to develop a new Navy Trident II RV. This would be required because the ABRV is too big and too heavy to fit on the sub.

With respect to Industrial Preparedness, I believe along with most other experts in the area, the Nation should have at least two suppliers of strategic re-entry vehicles. Since AVCO, the ABRV supplier, is already under contract for the MX shroud and the MX dispenser, it seems to me that the Defense Department would certainly want to continue the capability of General Electric which has produced every operational Air Force re-entry vehicle since 1962. If the Mark-12A is abandoned, there will be that unnecessary one-billion dollar cost penalty, and the Air Force will not be able to meet the SAC requirement and upgrade the next block of 150 minutemen missiles.

Finally, Mr. Chairman, let me address the Air Moble issue. In the air mobile configuration you must rely on a mid-course correction by the Global Positioning Satellite. This means that our strategic weaponry would be dependent on a non-survivable satellite system, not a realistic position for America to be in. However, with a mid-course guidance correction both Mark-12A and ABRV can kill the enemy target system.

Mr. Chairman, I return to the basics; Mark-12A meets the requirements, our budget deficit is large, we don't need to spend an additional one-billion dollars—the Air Force also doesn't need the schedule risk—and the Navy certainly doesn't need any problems on Trident II.

Thank you, Mr. Chairman.

Questions Submitted by Senator John W. Warner

Targeting Implications of Additional MK-12A Buy

Senator **Warner**. General Doyle, in the past there has been some confusion as to the attitude of the Strategic Air Command and the Joint Strategic Target Planning Staff toward the desirability of acquiring additional MK-12A's for the remaining Minuteman III missiles equipped with the MK-12A systems. What are the tradeoffs associated with acquiring additional warheads at the expense of larger, less accurate single warhead systems from a targeter's point of view?

Answer. [Deleted.]

Current Position of Expanding MK-12A Loading

Senator **Warner**. What is your understanding of SAC's and JSTPS's current position on expanding MK-12A loading on the Minuteman III force?

Answer. [Deleted.]

ABRV and Nuclear Weapon Employment Policy

Senator **Warner**. I understand that the President has approved a new nuclear weapons employment policy.

Would you discuss how the requirements for implementing this policy may bear upon the desirability of deploying the ABRV.

Dr. **Wade**. The U.S. policy of deterring a nuclear war requires, in part, flexible forces which are capable of denying an opponent the opportunity to realize his geopolitical goals. The strategic modernization program is specifically designed to enhance deterrence by maintaining the strategic balance and by overcoming Soviet advantages, such as prompt hard target kill capability, which have accumulated as a result of Moscow's relentless drive for superiority. An important part of the modernization program is the deployment of the MX with the ABRV warhead. The ABRV is a more effective reentry vehicle and its warhead has more modern safety features than existing designs. In addition, the ABRV has the potential to be designed to give a much higher yield, if this proves to be necessary in the future. The ABRV's flexibility and capability against hardened targets thus provides a direct contribution to our policy of preserving the strategic balance and enhancing deterrence.

HARDENING OF SOVIET LAND-BASED ICBM WEAPONS

Senator **WARNER**. How likely do you believe it is that the Soviets will continue to invest heavily in adding to the hardness qualities of their land-based ICBM force and other systems (e.g., C^3)?

General **DOYLE**. It is technically feasible for the Soviets to increase their silo hardness above their current high levels. However, upgrading the hardness of a significant portion of their ICBM force would require a substantial expenditure of resources and time. [Deleted].

ICBM: The Soviets continue to invest in structural hardening measures to upgrade the survivability of their ICBM silos [Deleted]. The Soviets are quite likely to continue investing in hardness qualities for upgrading their land-based ICBM force.

Military C^3: The Soviets [deleted] systems probably will be installed to meet more stringent survivability requirements.

Leadership Protection: The protective facilities developed for Soviet leaders [deleted].

The Soviet leadership survivability and wartime management program is believed to have begun in earnest in the late 50's and early 60's. [Deleted].

HIGH YIELD VERSUS MEDIUM YIELD

Senator **WARNER**. How much difference in terms of our abilities credibly to threaten to attack these more difficult targets would a [deleted] weapon make vis-a-vis a [deleted] weapon at any given level of accuracy?

ANSWER. As the accuracy improves, i.e., the CEP gets smaller, the difference in effectiveness between the yields vanishes. Thus, we find that at [deleted] yields have virtually the same effectiveness and the improvement conferred by the [deleted] yield is not worth the additional oralloy. On the other hand for very large CEP's, the relative improvement of the [deleted] yield over the [deleted] yield approaches a limit of approximately [deleted].

ABILITIES TO THREATEN ATTACK ON MORE DIFFICULT TARGETS

Senator **WARNER**. How much difference in terms of our abilities credibly to threaten to attack these more difficult targets would a [deleted] weapon make vis-a-vis [deleted] weapon as any given level of accuracy:

ANSWER. Increasing weapons yield from [deleted] will increase single weapon probability of kill against [deleted] for any given accuracy in the [deleted] CEP range. Specifically, the following table compares SSPKs for [deleted] at different accuracies. The design accuracy for MX is [deleted].

Single Shot Probability of Kill (SSPK) against [deleted].

CEP DIFFERENCE

Senator **WARNER**. Is it your understanding that a [deleted] CEP the difference in yield would be significant?

Answer. For current Soviet hard targets the improvement in performance of a [deleted] yield over a [deleted] yield is [deleted] for a [deleted] CEP and [deleted] for a [deleted] CEP. We consider the improvement significant at the [deleted] CEP and not worthwhile at the [deleted] CEP when the cost of nuclear material is factored in. The greater yield may be significant even with a [deleted] CEP, however, if the hardness of Soviet targets increases.

Senator **WARNER**. Major Raker, how would your analysis change if the MX program consists of 100 missiles instead of 200 missiles?

ANSWER. While an exhaustive analysis of a 100 MX missile deployment has not been conducted, I estimate that the change in the analysis would be limited to one chart. On the [deleted] supply/demand chart I showed that the [deleted] ABRV was the only RV candidate [deleted]. Halving the MX deployment halves the absolute [deleted] demand differences shown on the chart. Other programmatic changes have occurred since this analysis was performed. If the Nuclear Stockpile Memorandum were to be used as the basis for a reexamination of the question, I anticipate that the three RVs which previously [deleted], but by a smaller margin. The net result anticipated is that the [deleted] demand curve would appear in relatively the same location on the [deleted] Supply and Demand chart, and the absolute amount of difference in the [deleted] demand among the four RVs would be halved.

MK-12A PRODUCTION LINE SHUTDOWN

Senator **WARNER**. Does the fact that the MK-12A production line is in the process of being closed down affect the costs associated with producing this warhead as opposed to the ABRV for the MX? What impact would there be on the unit cost of these warheads if Congress were to act to sustain production of the MK-12A?

Dr. **WAGNER**. The Department of Energy has indicated informally to us that the relative direct costs for the ABRV warhead (W87) and the MK-12A warhead (a W78 modified to have most of the W87 features) would not be significantly influenced by the fact that the MK-12A warhead production line is being closed down. The Department of Energy also indicated that the relative costs of these warheads would not change significantly if Congress were to act to sustain production of the MK-12A.

QUESTIONS SUBMITTED BY SENATOR SAM NUNN

TRIDENT-II REENTRY VEHICLES

Senator **NUNN**. What potential does the Mark-12A have in terms of being utilized with the Trident II missile? What potential does the ABRV have in terms of the Trident II missile?

ANSWER. The Navy is currently studying various reentry body alternatives for Trident II. The MK-12A is the baseline candidate but other designs are also being considered including a modified MK-12A, and a new reentry body which carries the MK-12A warhead. The ABRV is also a candidate as is a new reentry vehicle which carries the ABRV warhead. The decision on which RV/warhead combination to choose will depend on the cost, oralloy usage, numbers of RV's which can be carried, diversity in the force, industrial base, and accuracy of the candidates.

MK-12A AND MM-III

Senator **NUNN**. What are the plans to upgrade additional MM-III's with MK-12A's?

ANSWER. There are no plans to upgrade MM-III's with MK-12A's beyond the 300 already being modified. However, it is planned to replace 50 MM-II's with 50 MM-III's using MK-12 RV's made available by the MM-III conversion and by using flight test assets.

LOGIC FOR A NEW WARHEAD

Senator **NUNN**. What is the logic for developing a new warhead for the MX missile as opposed to continuing the MK-12A programs?

ANSWER. The logic for a new RV for MX is based on the following factors: (1) ABRV is an advanced technology reentry vehicle with improved accuracy, enhanced all weather capability and increased hardness against nuclear effects. (2) ABRV has growth potential for a higher yield warhead which will provide an important hedge against future Soviet initiatives. (3) The ABRV warhead will incorporate modern safety features which will reduce even further the already small chance of a nuclear accident. Some modification of the W 78 (MK-12A warhead) would have been required to incorporate these features. Additional underground nuclear testing would have been required to establish the feasibility of the W 78 modification. While safety is always important, it is particularly significant for MX. Two of the candidate basing modes—the Continuous Patrol Aircraft and defended deceptive basing—may involve frequent movement of missiles and thus place an even greater premium on warhead safety. (4) The ABRV will use significantly less nuclear materials than the MK-12A at equivalent yield. These savings, combined with the cost that would have been required to upgrade the MK-12A fuze produce offsets that tend to balance out cost to the government of shifting to ABRV. (5) The ABRV provides an important element of diversity and advanced capability in the MIRVed ICBM force. (6) And finally, the ABRV can be developed and procured in time to meet a later 1986 MX IOC with acceptable schedule risks.

ACCURACY AND YIELD COMPARISON

Senator **NUNN**. What is the incremental increase in accuracy that the ABRV will provide over the MK-12A? What about yield? What shall the increase in accuracy and yield provide in terms of hard target kill that the MK-12A will not? Against what targets and how many will the ABRV provide a higher single shot kill probability than the MK-12A does?

Answer. The ABRV reentry error is expected to be slightly less than the MK-12A reentry error, [deleted] compared to [deleted] but when the reentry errors are combined with the overall system errors, MX has approximately the same CEP with either RV. However, the ABRV has an integrated radar-path-length fuze which improves its effectiveness significantly against hard targets. The effect is equivalent to reducing the system CEP from [deleted] to approximately [deleted].

The ABRV will be fielded at a [deleted] yield but this could be increased to [deleted] if MX accuracy was less or Soviet target hardness was greater than anticipated.

The relative performance against a hard target for both RV's is shown below in the table. Here we consider the case of the MK-12A with and without the new integrated fuze and compare the kill possibilities for the various yields at two CEP's; the design goal of [deleted] and the worst expected result of [deleted].

RV	Fuze	Yield	Kill Probabilities	
			[Deleted]	[Deleted]
MK-12A	Radar		[Deleted]	
MK-12A or ABRV	INTEG			
ABRV	INTEG			

The chart shows that if MX achieves its design goal of [deleted] it is possible to achieve a kill probability of greater than [deleted] with the [deleted] warhead. Furthermore, the kill probability is only [deleted] than that of the [deleted] warhead. However, if the CEP is [deleted] the kill probability for the smaller yield is less than [deleted] and is more than [deleted] than that of the [deleted] yield. The [deleted] option preserves the possibility of maintaining an acceptable kill probability. This table was constructed for the assumed silo hardness of [deleted]. Against softer targets, the RV's tend to have similar performance.

Finally, the chart above shows that the MK-12A without the improved fuze is markedly inferior to the ABRV, even at [deleted] CEP when both have the same yield. The MK-12A could be outfitted with such a fuze but only at a cost of $259M.

Range of Effectiveness of MK-12A

Senator Nunn. What PSI of hardness will the MK-12A work against? What Soviet targets are harder than that now and what is the expectation that these targets will become harder and by how much?

Answer. The MK-12A at maximum yield would achieve the same kill probability against a [deleted] target as the [deleted] ABRV would achieve against [deleted] one. Soviet hard targets are now estimated to be hard to [deleted].

Soviet silo hardness estimates have increased in recent years as we have better appreciated their hardening program and refined our estimation procedures. We are not projecting an increase in hardness although one is possible. The principal concern is that mobile basing of MX will lead to a deregulation of CEP.

Targets

Senator Nunn. What is the expectation that other targets will be hardened and to what degree?

Answer. Over the past decade, there has been a steady growth in the number of hard targets across the Soviet military spectrum. We expect that trend to continue for a variety of targets [deleted]. We expect most targets will be less hard than the hardest ICBM silos, which are currently estimated to have a hardness of [deleted] psi.

Completed Flights Tests of MK 12 and ABRV

Senator Nunn. How many flight tests of the MK-12 are completed and how many for the ABRV?

Answer. The MK-12 and MK-12A combined flight tests total approximately 400. The MK-12A configuration carried on Minuteman III has been tested 48 times on 19 flight tests. The significant design features of ABRV have been proven in ground tests and three prototype flight tests and subsystem flight tests. Note: No flight tests of the MX MK-12A have been conducted. Since the MX RV would have been about 10 percent heavier than the operational Minuteman III MK-12A it too would have required validation.

COMPATABILITY OF MK-12 AND ABRV WARHEADS

Senator NUNN. What is the compatability of both warheads in terms of basing options being considered? In other words, is one or the other better in the various options or are both about the same?

ANSWER. At equivalent yields a [deleted] CEP, performance of either the MK-12A or ABRV is essentially the same. This equivalency is true across the spectrum of basing options being considered. Should accuracy degrade to [deleted] then the increased yield available in the ABRV provides an essential hedge.

AF POSITION OF ABRV

Senator NUNN. General Burke, what is the Air Force position on the ABRV. Does the Air Force, in your personal view, continue to believe that the MK-12A should be the baseline reentry vehicle for the MX? Is the additional capability and additional cost of the ABRV warranted?

ANSWER. The Air Force supported MK-12A for cost and schedule reasons when it appeared the ABRV could not meet the 1986 MX IOC. The additional capability provided by the ABRV contributes an important element of diversity and advanced capability in the ICBM force. Its advanced technology design provides improved accuracy, enhanced all weather capability and increased hardness against nuclear effects. The ABRV will use significantly less nuclear materials than the MK-12A. This savings, compared with the higher MK-12A costs for the upgrade fuze and testing of its new IHE components as well as higher ABRV development costs, tends to balance out the costs to the government of transferring to the ABRV.

CURRENT REQUIREMENTS OF ACCURACY FOR THE MX SYSTEM

Senator NUNN. General Burke, what are the current requirements in terms of needed accuracy for the MX system (CEP and yield) for planned targets and how do the Mark 12A and ABRV net these requirements? Are there any future requirements that you anticipate and how could or would both systems meet those requirements.

ANSWER. As requirements are currently defined both the MK-12A and the ABRV meet the needed accuracy [deleted] (CEP) and yield. Minimum yield as such is not defined specifically but is considered in terms of available current inventory warheads as in the MK-12A or availability of special nuclear material for building a new warhead as in the ABRV. A shortage in SNM favors the ABRV because it will use significantly less nuclear materials than the MK-12A at equivalent yield; in terms of targeting efficiency both RVs can achieve 100 percent target efficiency against Soviet and Warsaw Pact target bases. The only real difference in military utility comes from the ability to modify the ABRV to increase its yield to offset any potential degradation in planned MX accuracy or increases in target hardness. The MK-12A does not have this flexibility.

ABRV PRIORITY IN RELATION TO OTHER STRATEGIC PROGRAMS

Senator NUNN. General Burke, what priority does the ABRV have in relationship to other AF strategic modernization programs as the B-1, ALCM, Strategic C^3, MC, ATB, etc. Would you give the ABRV a minimum ranking compared to other AF strategic programs?

ANSWER. The President's Strategic Modernization Program provides the blueprint for rebuilding a strong, credible nuclear deterrent and defense capability. The production of the B-1B bomber, development of an advanced technical bomber and deployment of air launched cruise missiles are paramount to improving the bomber force. Improving both capability and survivability of the land-based ICBMs through the development of the MX missile is next. In addition, improvement in C^3 is essential to effectively prosecute a nuclear war. The fiscal year 1983 budget initiates action to build and reconstruct a C^3 network in the face of projected enemy threats. Improvements in all three of the above areas are essential to establishing equivalency in nuclear forces with the Soviet Union. After the President announced his Strategic Modernization Program, the SECDEF decided to make the ABRV the baseline reentry vehicle for MX. Although the ABRV is a subsystem of MX, it is considered an integral part of the weapon system. The MX could be deployed without the ABRV, but for the reasons mentioned in previous testimony by Dr. Wade and Brigadier General McCarthy, the ABRV was selected vice the MK-12A.

COST IMPLICATIONS FOR THE ABRV VERUS MK-12A

Senator NUNN. If the MX program is rephased to have procurement of the missile coincide more closely with the final deployment mode (that is to skip the interim deployment altogether), what cost and other implications does this have for the ABRV versus MK-12A considerations? Can a better case be made for either in this circumstance? What are the funding implications for both to meet a 1989 MX deployment vice a 1986? (The special nuclear materials cost should also be calculated).

ANSWER. Assuming that Research and Development of the MX missile were to continue as presently planned and procurement of missiles delayed to be consistent with an IOC in 1989, then there would be no difference in program phasing for the development effort. The 3600 funding line would remain the same as currently programmed, including the ABRV profile, while procurement funding would move to the right. Since procurement lead time is approximately three years in advance of IOC, placing MX into a permanent basing mode in fiscal year 1989 would mean that funding would be required in fiscal year 1986.

Under these circumstances, it would be important to keep the ABRV on schedule so that it can be adequately flight tested prior to deployment. The first flight of ABRV is currently scheduled for test number six, which will be in mid-1984. As we plan to procure only enough MK-12A Reentry Vehicles to cover the first five test flights, it is important that the ABRV be ready so that the flight test program can continue uninterrupted.

Either reentry vehicle can be developed and fielded under the timelines implied above. Savings in special nuclear materials would not be changed. The ABRV warhead is a more efficient user of scarce oralloy than is the MK-12A warhead. We would expect that at an equivalent yield of [deleted] the ABRV uses approximately [deleted] less per warhead than does the MK-12A. Across a force of some 1050 warheads, this equates to an approximate savings of [deleted] (fiscal 1982 dollars).

LOGISTIC REQUIREMENTS FOR THE MARK-12A AND THE ABRV

Senator NUNN. General McCarthy, what are the requirements for the logistics and support for the Mark-12A and the ABRV. How much is common to current capability and how much additional new equipment and support is required for each system (please provide separately)? Is this factored in the cost differential between the two and in the total costs for each individually?

ANSWER. The general requirements for support of either the ABRV or the MK-12A reentry vehicle are the same. Logistics support analyses for ABRV is ongoing and will provide an integrated support program. Requirements for logistics support elements such as personnel skill levels, maintainability, reliability and human factors are the same for either reentry vehicle.

Organizational (SAC) maintenance will consist of the remove and replace concept and will only be accomplished at a designated field facility. Items not repairable by SAC will be transported to a depot level maintenance area.

DOE developed/managed items will be serviced by their captive industrial contractors.

The MX MK-12A was planned to be supported in the same manner as the MM III MK-12A. Most of the support equipment which supported the MK-12A can be used without modification in the MX program, although a new electrical test set was planned because the current MK-12A test set (a modified MK-12A Reentry System Test Set) is no longer procurable. It will be necessary to buy additional sets of support equipment to support the MK-12A because all existing equipment is being fully utilized to support the MM III operational needs.

The ABRV will require the development of a new set of mechanical and electrical support equipment. Equipment will be required to support the Full Scale Engineering Development and follow-on operational deployment activities. The feasibility of modifying existing MK-12A mechanical support equipment to accommodate the ABRV is being investigated.

Yes, the estimated cost for both the MK-12A and ABRV did include costs for support equipment development and procurement. Accordingly, these costs have been factored into the cost differential between the two reentry vehicles.

STRATEGIC AIR COMMAND PREFERENCE TO STAY WITH THE MARK-12A

Senator NUNN. Did the Strategic Air Command indicate a preference to stay with the Mark-12A. If so, what was their rationale?

ANSWER. SAC has consistently recommended the deployment of the ABRV at a yield of [deleted]. for MX [deleted].

AIR FORCE RECOMMENDATION ON THE REENTRY VEHICLES

Senator NUNN. General McCarthy, what was the Air Force recommendation on the reentry vehicles for the MX during preparation of the fiscal year 1983 budget?

ANSWER. The Air Force supported the MK-12A as the baseline MX Reentry Vehicle during preparation of the fiscal year 1983 budget. This support was based on cost and schedule concerns. Up until last fall, it appeared that ABRV could not be made available for MX deployment until late 1987—a full year later than the currently scheduled system IOC. Also, there were no funds in the Air Force Budget for ABRV.

Schedule problems have been eased in two ways. First, restructuring of the MX program in response to the President's decision of October 2, 1981, caused the system IOC to shift from July 1986 until later in the year. Second, it was determined that an arming and fuzing system being developed by the SANDIA National Laboratory could be used, allowing us to develop and procure ABRV in time to meet the late 1986 IOC.

The cost issue was mitigated when OSD provided the Air Force with funding for fiscal year 1983 and beyond. This was done concurrent with announcement of the decision. With removal of these two major concerns, we support the ABRV and the benefits it brings to the MX program.

WHY AIR FORCE FAVORED THE MK-12A

Senator NUNN. Could you provide for the record the 4 or 5 major reasons why the Air Force favored the MK-12A as the reentry vehicle for the MX?

ANSWER. Prior to the OSD decision, we advocated remaining with the MK-12A as the baseline MX Reentry Vehicle principally for cost and schedule reasons. Schedule problems were eased in two ways. First, restructuring of the MX in response to the President's decision of October 2, 1981, caused the system IOC to shift from July 1986 until later in the year. Second, it was determined that an arming and fuzing system being developed by the SANDIA National Laboratory could be used, allowing us to develop and procure ABRV in time to meet the late 1986 IOC.

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CONCERNS ABOUT NEW DEVELOPMENT OF THE ABRV

Senator NUNN. In pursuing its recommendation to go with the MK-12A, what were the chief concerns that the Air Force expressed about entering into a new development with the ABRV?

ANSWER. When originally baselining the MK-12A, the Air Force was concerned about the greater cost to the Air Force of the ABRV and a potential schedule risk to meeting initial operational capability for MX. Since the original Air Force recommendation, DOD has opted to make funding for the ABRV available to the Air Force because, among other reasons, the total cost to the government would be about the same as the MK-12A. Further, the potential schedule problem is no longer viewed as a significant risk.

RECLAMA TO SHIFT FROM MK-12A TO ABRV

Senator NUNN. Under the budget process in DOD a service can reclama a decision if that service feels strongly its original decision should hold. Did the Air Force reclama the DOD decision to shift from the MK-12A to the ABRV?

ANSWER. No, the Air Force did not submit a formal reclama to OSD appealing the decision to shift to the ABRV.

SUBMIT AIR FORCE RECLAMA

Senator NUNN. Would you submit for the record a copy of the written Air Force reclama in support of the MK-12A reentry vehicle?

Answer. As stated previously, the Air Force did not submit a formal reclama to OSD following the ABRV decision.

Major Point in the Air Force Reclama

Senator Nunn. Would you state for the subcommittee the major points in the Air Force reclama?

Answer. Prior to the OSD decision, we advocated remaining with the MK-12A as the baseline MX Reentry Vehicle principally for cost an schedule reasons. Schedule problems were eased in two ways. First, restructuring of the MX in response to the President's decision of October 2, 1981, caused the system IOC to shift from July 1986 until later in the year. Second, it was determined that an arming and fuzing system being developed by the SANDIA National Laboratory could be used, allowing us to develop and procure ABRV in time to meet the late 1986 IOC.

The cost issue was mitigated when OSD provided the Air Force with funding for fiscal year 1983 and beyond. This was done concurrent with announcement of the decision. With removal of these two major concerns, we support the ABRV and the benefits it brings to the MX program.

I must reemphasize, however, that a formal reclama was not submitted to OSD following the ABRV decision.

Air Force Estimate of the ABRV Development Costs

Senator Nunn. During the process last year, what was the Air Force estimate of the total ABRV development costs?

Answer. The ABRV cost increment over the MK-12A baseline is approximately $881 million in fiscal year 1982 constant dollars.

It should also be noted that offsetting cost advantages accrue to the government as a result of the decision to proceed with ABRV. For one thing, the ABRV warhead requires less scarce Special Nuclear Material (SNM) than the MK-12A warhead would have. Savings that result from the more efficient use of SNM are estimated to be approximately [deleted] (dollars fiscal year 1982).

Additionally, if the MK-12A would have been retained, an improved arming and fuzing system would have been added, increasing the cost by approximately $259 million (dollars fiscal year 1982). These savings and added expenditures tend to offset the cost of ABRV.

Is That Still the Air Force Estimate

Senator Nunn. Is that figure still the estimate of the Air Force?

Answer. Yes, we consider this figure to be an accurate estimate of the additional funding required to develop the ABRV.

Development Cost of MK-12A

Senator Nunn. What is the development cost of the MK-12A?

Answer. If we would have continued with the MK-12A program, development costs would have been approximately $111 million in fiscal year 1982 constant dollars. Tasks that would have been accomplished consisted primarily of adapting the MK-12A mechanically and electrically to the MX missile.

It should be noted that an improved fuze would have been added to the MK-12A, increasing development costs by approximately $108 million and procurement costs by approximately $151 million (fiscal year 1982).

Finally, the ABRV warhead uses less Special Nuclear Materials than the MK-12A warhead. These savings would approach [deleted] (fiscal year 1982 dollars), and when combined with the cost to add the improved fuze to the MK-12A, tend to balance out total cost to the government of shifting to the ABRV.

Lowest Technical Risk

Senator Nunn. Which of these two systems has the lowest technical risk and by what order of magnitude?

Answer. Both the MK-12A and the ABRV are judged to be of low technical risk. The modifications to the MK-12A of an upgraded fuze would require flight testing and IHE would require underground testing. The ABRV has these features inherent in the design. The ABRV also requires flight testing, but the technical risk is considered low. However, both the MK-12A and the ABRV incur moderate schedule risk to meet the late 1986 MX IOC.

SCHEDULE RISK FOR EACH SYSTEM

Senator NUNN. What schedule risk would each system impose?

ANSWER. Both the MK-12A and the ABRV are judged to be of low technical risk. The modifications to the MK-12A of an upgrade fuze would require flight testing and IHE would require underground testing. The ABRV has these features inherent in the design. The ABRV also requires flight testing, but the technical risk is considered low. However, both the MK-12A and the ABRV incur moderate schedule risk to meet the late 1986 MX IOC.

EFFECTIVELY EQUIVALENT FOR MK-12A AND ABRV

Senator NUNN. Are the MK-12A and the ABRV, from a weapon system performance standpoint, effectively equivalent?

ANSWER. At the projected MX CEP of [deleted] both the MK-12A and ABRV are essentially equivalent. Both RVs provide [deleted] percent targeting efficiency against the Soviet and Warsaw Pact target base. The potential difference between the two RVs comes from the ABRV ability to be deployed with a greater yield, if necessary, to counter a CEP degradation or increase in target hardness.

Senator WARNER. Thank you for your indulgence. We will take a short recess so that the next panel can be properly seated.

[Whereupon, at 3:12 p.m. the subcommittee took a short recess.]

MX WARHEAD (ABRV)—continued

The subcommittee reconvened in closed session, at 3:15 p.m., in room 212, Russell Senate Office Building, Senator John W. Warner, chairman, presiding.

Present. Senators Warner and Exon.

Staff present: Frank J. Gaffney, George K. Johnson, Jr., Patrick L. Renehan and James C. Smith, professional staff members, Karen A. Love, staff assistant.

Also present: Arnold Punaro, assistant to Senator Nunn.

Senator WARNER. The subcommittee will be in order.

Gentlemen, I appreciate your coming to add your views on this issue. You have heard it discussed and I thought very capably. Please present your perspective on this.

STATEMENTS OF DR. BATZEL, DR. KERR, AND MR. ROSER

ABRV DESIGN

Dr. BATZEL. I am going to speak to the nuclear design issue related to the ABRV. My comments will be brief.

[Deleted].

From the point of view of diversity, the question of more than a single warhead for major strategic systems, I think diversity is a viable and good argument. [Deleted].

I have no question with respect to the reliability of the W-78 MK-12A warhead. I think it is a well designed warhead and the weaponization program has been well executed. [Deleted].

Dr. KERR. Thank you, Mr. Chairman.

The W-78 of course is the responsibility of the Los Alamos Laboratory. [Deleted].

Thank you, Mr. Chairman.

Mr. ROSER. Thank you, I don't think that I have a great deal I can add. I think the Department of Defense has taken a very responsible look at the difference between the Mark-12A and the ABRV. I thought that the statement that Secretary Wade made was right on target, and well articulated. I believe that the R. & D. test and production complex can meet the IOC of the MX with either system. We have been asked that question and we have looked at it and we believe that sincerely.

It is a success-oriented program either way you go but I believe, Mr. Chairman, that the decision is well taken and I don't want to leave the impression that in the system we simply move to determinations of the Department of Defense. If we don't believe those are sound we do not hesitate to go back and argue the point but in this case I think the decision is well founded. [Deleted].

Senator WARNER. Would you be kind enough to put in the record what is oralloy [deleted].

Mr. ROSER. Oralloy, Mr. Chairman, is highly enriched uranium. It is one of those terms that we use in the weapons complex. It is derived from Oak Ridge alloy, it is a short name for Oak Ridge alloy, it is 93.5 percent enriched U^{235}. But the other term for it is highly enriched uranium. I think that is all I have to say, Mr. Chairman.

[Deleted].

Senator WARNER. All right.

RISK POSED BY DESIGN CHANGES

Dr. Batzel, do you believe the changes that will be made to the ABRV from its flight test version represent significant risk?

Dr. BATZEL. No, we don't see a problem.

Senator WARNER. Dr. Kerr, do you have an opinion on that?

Dr. KERR. I don't believe it is appropriate for me to even speak to that. Our laboratory is not responsible for the design of the ARBV warhead.

Senator WARNER. [Deleted.]

Dr. KERR. [Deleted.]

Senator WARNER. [Deleted.]

Dr. KERR. [Deleted.]

Senator WARNER. [Deleted.]

Dr. BATZEL. [Deleted.]

Dr. KERR. [Deleted.]

Mr. ROSEN. [Deleted.]

Mr. GAFFNEY. [Deleted.]

Dr. KERR. [Deleted.]

Dr. BATZEL. [Deleted.]

Mr. ROSEN. [Deleted.]

Mr. GAFFNEY. [Deleted.]

Mr. ROSEN. [Deleted.]

Dr. BATZEL. [Deleted.]

Dr. KERR. [Deleted.]

Senator WARNER. [Deleted.]

Dr. BATZEL. [Deleted.]

Senator WARNER. But there is a trade off between the two. On these weapons is there a trade off on the CEP?

Dr. BATZEL. The Air Force should speak to that. I don't consider myself an expert in that particular area.

Dr. KERR. To elaborate, and first I agree with Roger as to who should speak to the CEP. [Deleted.]

We do no independent work in that area and we have no reason to question what we were shown.

Senator **Warner**. Thank you very much. I appreciate your coming and I think we have put this case to bed once and for all.

[Whereupon, at 3:40 p.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

MONDAY, MARCH 22, 1982

U.S. SENATE,
SUBCOMMITTEE ON STRATEGIC AND
THEATER NUCLEAR FORCES,
COMMITTEE ON ARMED SERVICES,
Washington, D.C.

STRATEGIC FORCES POLICY

The subcommittee met, in open session, pursuant to notice, at 10 a.m., in room 224, Russell Senate Office Building, Senator John W. Warner (chairman) presiding.

Members present: Senators Warner, Goldwater, and Quayle.

Staff present: Frank J. Gaffney, professional staff member; Paul C. Besozzi, minority counsel; George K. Johnson, Jr. and James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Dennis P. Sharon, assistant to Senator Goldwater; Buzz Hefti, assistant to Senator Warner; and Frank Krebs, assistant to Senator Cannon.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator WARNER. Today, the Subcommittee on Strategic and Theater Nuclear Forces concludes its set of comprehensive hearings relating to the fiscal year 1983 Defense authorization bill.

This morning, we will receive a wrapup on strategic forces policy and posture from Assistant Secretary of Defense Richard Perle.

Subsequently, at 2 p.m. this afternoon, we will continue our consideration of issues relating to chemical warfare.

Mr. Perle, we thank you for the cooperation and assistance you have given this subcommittee throughout this series of hearings. We have set a record in total number of hours for this subcommittee. I am grateful to have with me my distinguished colleague, Mr. Goldwater, this morning.

We are here to tie down a lot of loose ends which developed after we have gone back over the record and I felt it was necessary to put in some additional testimony on several subjects.

Do you have any opening statement?

Senator GOLDWATER. No; I wish you would take care of a few of mine.

Senator WARNER. Yours are all flying.

Mr. Secretary, you have a prepared statement. Do you wish to lead off with that?

STATEMENT OF HON. RICHARD N. PERLE, ASSISTANT SECRETARY OF DEFENSE FOR INTERNATIONAL SECURITY POLICY

Mr. PERLE. If that serves the pleasure of the committee. It is a brief statement.

Let me say it is no ordeal to appear before this subcommittee which approaches seriously these difficult issues. We appreciate the opportunity to carry on a dialog.

The committee has been briefed many times over the past several months on our strategic modernization programs. Since I know you are intimately familiar with the program, I think that the time this morning could best be spent by concentrating on a few issues rather than attempting to summarize yet again the administration's program.

I would like to focus on some questions that have been raised about the MX and B–1B portions of the program because it is there that some continuing controversy remains.

MX BASING

One set of questions concerns the two-step decision on MX basing. Why, it has been asked, is the administration proceeding with interim basing of MX in fixed silos and why are we exploring three different long-term basing modes?

To answer these questions, it is necessary to note two important facts. First, the MX missile has had a highly successful research and development program and will be ready for initial deployment by 1986. We must be able to draw on its capability as soon as possible so that we can begin to offset the current, highly destabilizing, Soviet monopoly in prompt hard target kill weapons.

Second, our own analyses of survivable basing modes indicated that three potential approaches had offered significant promise. We did not possess sufficient information last October—or do we now—to enable us to decide conclusively which one or more of those approaches would provide the necessary degree of survivability.

Given the importance we attach to this program we thought it best to come to a frim conclusion before making the costly investment associated with this decision.

Based on these facts, we decided that it was most prudent to deploy the MX in an interim mode beginning in 1986. This would enable us to satisfy our compelling need to start offsetting the unilateral Soviet advantage in prompt hard target capability, while continuing our research and development on which option, or combination or options, to select as the ultimate basing mode.

Let me just add, Mr. Chairman, that there is a great deal to be said for resorting, in the final analysis, to more than one basing mode. Since there would be a multiplicity of basing modes, even if each entails the basings of a relatively small number of missiles, it imposes an almost unsurmountable burden on the Soviet side since they would have to deploy forces capable of effectively attacking each of those basing modes. This might be something we can get back into in the course of the discussion.

MULTIPLICITY OF MX BASING

Senator **Warner**. As you know, as with the Chairman in our private conversations, I have stressed with you the desirability of looking at ultimate basing of the land-based segment of the Triad in a multiplicity of modes, as you are speaking of now.

Is this the first time that an administration witness has addressed multiplicity option which I am studying now? That is to say, the use of one or more basing modes?

I don't have before me the previous testimony of yours or Secretary Weinberger's, but my recollection is that it has been fixed on perhaps a single mode as opposed to this multiplicity which you and I have been discussing.

Mr. **Perle**. We have always thought it was worth looking at a multiplicity of basing modes. Over the years, we have gotten into the habit of believing that there were single solutions to problems. That observation is hardly surprising because for a long time our technological procedure indicated that there were single solutions and we could thus keep a technological generation ahead of the Soviets.

Hence we could go from the B–47 to the B–52, for example, confident that that B–52 would last for a long time because the Soviet defenses were not up to the task of intercepting it, indeed it did remain viable for many years. It was possible to undertake the development of sea-launched ballistic missiles confident that we were sufficiently far ahead of the Soviets technically. We correctly assumed that they would remain survivable for a long time.

But as time has gone on and as the technology gap once more has narrowed, it is no longer possible to stay a technological generation ahead. As a result, we will be forced in the future to be a good deal more imaginative and resourceful and to try to impose burdens on the Soviet technological base that will render the Soviets incapable of defeating all of the various elements of our strategic force.

One can imagine, going beyond the Triad and deploying the land-based missile segment in two or three different basing modes, because the Soviets could not deal with them all. They might be able to deal with any single one of them, however.

The Soviet answer to MPS, for example, was simply to proliferate warheads on the Soviet side. The Soviet answer to deep underground shelters is very logical—deploy very large warheads. But, if they have very large warheads, they may not have enough boosters to proliferate large numbers of small warheads—which they might need to use against a different basing mode.

There are, therefore, ways to impose stress on the Soviet system so that several basing modes, each one accommodating only a portion of the force, will make the Soviet attack potential inadequate or leave it inadequate to accomplish its objectives.

This approach, which we are considering is very productive and, it is one of the reasons we are most anxious to keep open the freedom to pursue all basing modes, since we want the option of more than one, if more than one turns out to be useful.

STRESSING SOVIET DEFENSE

Senator **Warner**. When you say "stressing," you are talking about economics there, aren't you?

Mr. **Perle**. I am talking about economics and technology. It has often been said, and I am inclined to agree, that one of the great virtues of bomber forces in an era dominated by ballistic missiles is that it has forced the Soviets to spend vast sums in order to deal with that bomber force, far more than we spent on the bomber force itself.

Senator **Warner**. What sort of multiples?

Mr. **Perle**. The estimates are that the Soviets have put over $100 billion into their defenses to deal with the B-52's. I can remember, or barely remember, when Mr. McNamara was Secretary of Defense, and the mood in the Pentagon was that this was the age of ballistic missiles and we could get along without slow delivery means like bombers.

Had we done that, had we made that mistake, we would have freed the Soviet Union to devote the whole of its resources to dealing with ballistic missiles and I think we would be in some trouble now.

As it is they drained away a significant percentage of their total defense costs trying to cope with manned bombers. I am delighted we are now in a position after they have made that investment to upgrade the bomber force so that they are going to do it all over again.

While this is not the ideal way to achieve security, if we can impose on them burdens larger than they can manage, I think we will have accomplished our purpose.

Senator **Warner**. All right, let us return to your statement.

Mr. **Perle**. I was speaking of continuing our research and development on which option or combination of options to select. The Congress as you know, has mandated that this decision be made by mid-1983. We intend to meet that deadline.

In the interim, however, I would urge you not to constrain these research and development efforts. The three candidate basing options were not chosen carelessly; they represent our best judgment on how to assure the survivability of MX. We are being restricted in our efforts to explore and develop these options. In the end this could result in a less than optimal solution to the MX survivability questions.

Additionally, restricting our options would eliminate one or more of the things that the Soviets now have to contemplate. I realize there is great controversy over the potential for an airborne solution like Big Bird. I can assure you however, that when the idea surfaced the Soviets began to devote resources to thinking about how to counter it, and they will continue to do so as long as it is a live option for us.

Even if we had concluded that this was not the most promising of the options I would be in favor of keeping the technology program going, both because it may mature and develop into a basic method of choice or one of them, and because it has to create stress for the Soviet system.

MX AND TRIDENT II

Mr. Chairman, a second question that has arisen over the past several months is: Why do we need to buy two missile systems with hard target capabilities? Specifically, why buy both MX and Trident II?

We are proceeding with both the MX and the Trident II for a number of sound military reasons. First, it would be extremely unwise to concentrate such an important military—and deterrent—capability such as prompt hard target kill in a single weapon system. To do so would be to risk losing that capability to unexpected system failure, or to some form of preemptive strike.

This area is one in which we have fallen dangerously behind the Soviet Union. To put all of our eggs in one basket would entail an inordinate risk of losing that capability in the event of an unexpected failure or to some form of preemptive strike.

Indeed, if the Soviets move to develop an effective means of preemptive attack, such a concentration in one system would present an extremely attractive target and would introduce an element of instability at the very time we are trying to restore the strategic balance.

Second, deploying the MX and the Trident II also increases the flexibility of our strategic posture.

Third, and finally, the Trident II will not begin to enter the inventory until 1989—some 3 years after the MX. As I noted earlier, it is essential that we begin to offset the Soviet prompt hard target kill monopoly as soon as possible—and that means before the end of the decade. As with our overall Triad, deploying more than one prompt hard target capable weapons system will severely complicate Soviet offensive and defensive planning.

B–1B

The final question I would like to address in my prepared remarks, Mr. Chairman, is why we need the B–1B. I think the point has been made clearly in previous hearings, but let me summarize it for you.

We need a penetrating bomber. The B–52 will no longer be able to perform that role with high confidence by mid-decade. Only the B–1B can provide us with this capability in the near term and it will remain effective well into the 1990's. Also the B–1B's major improvement in base escape ability over the B–52 will increase substantially the survivability of our bomber force.

I am glad we are going to go ahead with the B–1B and I am sorry we are going ahead 4 years later than we should.

There are a number of additional points which I would like to emphasize. Once the advanced technology bomber enters the inventory, the initial interaction of the B–52's armed with ALCMS and a penetrating force of B–1B's and advanced technology bombers, and later the interaction of B–1B's in a mixed ALCM carrier and penetration role combined with penetrating advanced technology bombers will place the highest possible degree of stress on Soviet air defenses.

Furthermore, during its long lifetime, the B–52 has also assumed major conventional warfare missions in Southeast Asia, as part of our current strategic projection force, and in a maritime context. As the B-52's are retired, the B-1B will be able to assume these important conventional roles.

Thus the B-1B makes good sense for quite a wide variety of reasons, and it will be an important part of our conventional and nuclear deterrent posture well into the next century.

As a result, we believe it is essential that we proceed with the B-1B in addition to the advanced technology bombers, and we ask your continued support for both programs. The importance of that request for support is that, without this committee, we would have gotten out of the manned bomber business long ago. You have carried the ball this long and we hope you will carry it a little longer.

Mr. Chairman, that concludes my opening remarks.

LONG-TERM MX BASING MODE

Senator WARNER. Mr. Secretary, returning then to the land-based system, I concur in your viewpoint that we ought to look in terms of the permanent basing mode of the MX and multiple type of basing selections. You state that the three candidates—are we limited to three in the R. & D., or is there a possibility that there may be another?

Mr. PERLE. We are looking at three at the moment. There are possible combinations and it has been our experience historically that the harder we look the more likely we are to find something. There are many people looking for innovative approaches to MX basing and I wouldn't exclude coming up with other ideas, but we are determined to work to the deadline that has been set for us.

INTERIM MX BASING MODE

Senator WARNER. As Congress proceeds to review this defense budget, and there is a pressing need for cutbacks in defense, what are the areas that will receive a great deal of scrutiny?

I must confess to you that the chairman has some misgivings about the interim basing system for the MX missile in the silos, as to whether or not to delete that money at this point in time and rely on other programs and an accelerated decision concerning MX basing presumably moving toward this multiplicity of permanent land-based options.

The concern I have is that as we consider whether or not this should be deleted is how the interim option relates to the entirety of the President's package. If Congress were to eliminate the interim basing mode and request an accelerated decision in the other areas and continue—I want to stress that "continue" with the MX missile—although in a somewhat stretched-out program, what is the impact on the other elements of the President's program?

Mr. PERLE. Well, Senator Warner, as you know——

Senator WARNER. It is a degradation—let us look at it that way.

Mr. PERLE. The program has been conceived as an integrated whole and we have regarded ourselves as burdened by the need to modernize the whole of our strategic force at one time, something we have not had to do previously in our history. At the same time, we are gratified at the opportunity to design a modernized strategic force with all of the elements designed to interact in a mutually supporting way.

So it is a little bit like a puzzle that is popular with the children now; if you take one means out, you begin to dismantle the entire program. Obviously, the interim basing mode does one thing of immediate consequence and that is that it begins to close the gap in prompt hard target kill capability, which we believe is important because that gap has become a very dangerous one.

We would lose time if we refrained from the interim basing mode because the earliest date on which we could be ready with a long-term solution would be a great deal later than the time when we can start on an interim basing mode.

Second, we would undoubtedly increase the procurement cost of the missile itself if we were to slow down procurement of the missile.

Alternately, if we were to keep the procurement on schedule, we would have to put the missiles in warehouses where we would get no interim value from them. In addition they would remain just as vulnerable or indeed more vulnerable than they will be in the interim basing mode.

Finally, we would throw off the phasing of the introduction of the various elements of the strategic modernization program. As you know, our forces operate with synergistic effect. The bombers have a role in assisting the submarines, and the submarines have a role in assisting the bombers, and the ICBM's help both bombers and submarines.

We would like to phase the program in on the schedule that we have set for ourselves. I can understand the concern regarding the cost of the interim basing mode.

We estimate that the total cost is something like $3.6 billion. One billion dollars of that will go for development that would be useful in whatever ultimate basing mode is selected. We are talking about a cost increment for the interim basing on the order of some $2.6 billion. For that we will get some interim capability and we will be able to proceed in an orderly fashion with the production of the missile itself.

Senator WARNER. Let us go back to that $3.6 billion and you say $1 billion of it would be related to the long term?

Mr. PERLE. To any of the candidate basing modes.

Senator WARNER. Would you expand on that.

Mr. PERLE. I believe that $1 billion involves technical development, R. & D., that would apply to any basing mode. That is the cannister which is going to be the launching device, and whether the basing is deep underground or in a mobile mode with defense overlay, we are going to have to develop that cannister and some of the money goes for that sort of development.

I think we could give you a breakdown on it.

Senator WARNER. That breakdown is very important, Mr. Secretary, as we look at this deliberation because, should it be the judgment that the interim system be eliminated, that is the funding for interim basing, we would want to salvage those parts which were essential to the long term, so I think a very careful breakdown would be helpful.

[The information follows:]

MX Interim Basing Costs

With regard to the total basing cost to complete the interim basing of 40 MX missiles in existing Minuteman silos, the figure involved is $3.6 billion in constant fiscal year 1982 dollars. This figure breaks into $1.5 billion for research and development, $1.4 billion for procurement, and $0.7 billion for construction. Of that total, only $2.6 billion is really peculiar to the interim silo basing and that breaks out as follows: $1.0 billion for research and development, $1.1 billion for procurement, and $0.5 billion for construction. The silo-peculiar tasks performed are the research, development and procurement of silo equipment, such as C^3, power supplies, physical security, shock isolation, and missile emplacers, and the assembly and checkout and modification/construction of the silo and support base.

The balance of $1 billion therefore funds tasks that will be required for any MX basing mode. Those include the research, development and procurement of the missile canister and its environmental control, and logistics support facilities.

The rationale for the interim MX deployment has been well thought out and relates to the important problems which we are facing today. We have two problems with the Minuteman system. The first and better known deficiency is that increases in the Soviet threat have reduced the expected survivability of the force to an unacceptable level. The proper response to this is to develop a survivable, long-term basing mode for the modern missile. The second deficiency is that increases in nuclear hardness of Soviet ICBM silos and other important facilities have reduced our ability to put those targets at risk. Knowing this, the Soviets feel less constrained from adventurism around the world, less interested in strategic arms reduction talks, and encouraged to contemplate outright coercion, either pre- or post-attack. The best response in this case is to deploy the powerful MX missile as soon as possible, even if a truly survivable basing mode is not available at that time. The quick reaction hard target kill capability of MX immediately corrects that second deficiency by focusing the Soviet's attention on the survivability of their own forces, with a net reduction in the current instability. Another response, either as an alternative or as a complement to the first, would be to pursue meaningful strategic arms reduction talks with us. The Soviets would have to regard active MX production lines as a deterrent against any plans they might have for a "breakout" designed to give them a sudden, perhaps irretrievable strategic advantage. Finally, it may prove to be that a combination of basing modes will be the best solution to MX survivability and that the interim basing mode will be part of such a synergistic approach.

START TALKS

Then we should also have your views on the impact of such a decision on arms control.

Mr. **Perle**. I am glad you asked that. As you know, Mr. Chairman, we are now involved in the final few weeks of preparation so that at an appropriate time we will be in a position to make proposals to the Soviets in the START talks.

We already have proposals on the table with respect to intermediate range ballistic missiles. I am very much involved in the preparation for those talks. While different agencies have somewhat different views on how we should proceed, there is at least one common theme running through all of the agency positions, namely that we should aim toward significant reductions in the strategic forces.

This inevitably means that we are going to be able to provide for the force posture that the Joint Chiefs of Staff advise us is essential to deterrence. We are going to need a smaller number of more capable weapons. In the land based ICBM area that clearly is the MX missile and there is no candidate in competition with it.

If we are going to approach the Soviets with proposals for sharp cutbacks, we have to do so with a knowledge that we have in train a development in the procurement program that will give us a force posture, at the point when those reductions will go into effect, that is adequate to our purposes.

Frankly, I do not see how we can do that without bringing the MX on line.

ACCELERATING MX BASING IOC

Senator **Warner**. But would not a suitable substitute be an earlier IOC for the survivable system? In other words, I can clearly see how the interim system is a driving factor in arms control, but if it were substituted with an earlier IOC for the permanent solution, there might be a trade-off, at the same time enabling Congress at this critical point in our budgetary cycle to find some funds for fiscal years 1983 and 1984, which are critical years in my judgment.

Mr. **Perle**. I would hope that we will find it possible to compress the time allotted to us to come up with a permanent basing mode. There isn't very much time left to do the job in any case. If we are able to save time we certainly will because the sooner that decision is made the better.

Depending upon what that decision is, it may be possible to expend less then the full amount of time for the basing mode program. But I would not want to make the assumption now that it would be possible to save any significant amount of time.

STRATEGIC STABILITY

Senator **Warner**. This is the last question before deferring to my colleagues.

In this context the issue is raised frequently that this interim system provides a destabilizing element in the ovarall strategic symmetry between the United States and the Soviet Union. Therefore, when you take into consideration that the interim-based MX may prove to be a tempting target, plus the budgetary costs associated with it, the case for elimination becomes stronger.

Mr. **Perle**. Mr. Chairman, I don't believe it is destabilizing to have a capability comparable to the capability we know the Soviets already have. Indeed for us to be in a situation where the Soviets have a capacity to strike our ICBM force and destroy it and we have no comparable capability, strikes me as the least stabilized condition.

Senator **Warner**. On the argument I was using, I coined what we called the "tempting target doctrine."

Mr. **Perle**. There is no question, the Soviets regard as tempting targets any U.S. strategic capability that could retaliate and make our deterrent a realistic one.

Senator **Warner**. But the survivability of these interim systems versus the others are substantially different?

Mr. **Perle**. The interim basing mode will be as survivable, or practically as survivable, as the weapons they would replace. The difference is that if it survives, one has 10 survivable weapons instead of 3. Each of those has significantly greater capability, and indeed they will be the only reentry vehicles in our inventory for that capability.

The Soviets, when one looks at the way they have configured their forces and particularly their command and control system, are not the least bit shy about going to great lengths to protect themselves.

It is terribly important that we have the capacity in the second strike situation to go back and target the critical command and control centers and the Soviet leadership itself. Those surviving MX warheads might be the only capability we have to do that.

Senator WARNER. Surviving is the key word.

Senator Goldwater?

ACCELERATING THE STRATEGIC MODERNIZATION PROGRAM

Senator GOLDWATER. Mr. Chairman, I have to apologize for not having been at more of these meetings, but we have completed our work in the Tactical Warfare Subcommittee and I have heard the same thing throughout the testimony before that subcommittee that I have heard this morning and I have heard elsewhere. The Defense Department keeps talking about the acquisition of weapons systems in 1989 or 1990.

Now this is an old, old theory. I have heard it argued many years ago and I don't discount it now and I didn't discount it then. I think the Soviets are in a position now to blackmail us and I don't think using the term "1989 and 1990" is going to help us one bit.

I have very grave doubts that this country has the industrial capacity or the money to match the Soviets. I would like to see us have the desire and I would like to see the language coming out of the Pentagon such that it indicates to any potential enemy that while we may not be able to match them gun for gun, we can certainly match them in our determination.

Something has to be done to shorten this time. We are talking about the B-1 getting into inventory 5 or 6 years from now. We have built four of those rascals and they are sitting out there on the ramp and they don't need tremendous modification.

We have been arguing about this MX basing mode for years and we still have empty silos sitting around in the West. We are going to buy the MX and we have the ability to base it, but we keep putting it off.

My question is: What happens when the Soviets someday tell us to do something or Johnson Island is going to disappear on Tuesday at 10 o'clock? On Tuesday at 10 o'clock Johnson Island disappears. I don't think that this country would have the will to carry through.

I am not lecturing you, and I am merely offering this as an observation of an older man who has spent his lifetime studying this subject. I don't think we can afford the language that is coming out of the Pentagon, "Well, we will do this for the interim."

We should get off our backs and say, "We are going to do this tomorrow, and we are going to buy airplanes." My subcommittee has charge of most of the airplanes and we are not buying enough airplanes this year to make up the natural losses, the attrition and losses of airplanes that run into each other and have accidents on the ground and catch fire. So we are not gaining on the Soviets in the air.

If we built every main battle tank ordered this year they would still outnumber us about 4 to 1 instead of 9 to 1.

You understand what I am getting at?

Mr. **Perle**. I do indeed, Senator, and we share the view that deficiencies have been allowed to develop across the board. It is indeed high time we got on with some programs and that is precisely what we are proposing to do.

The proposed basing mode of the MX is interim, but it is also immediate at the same time. We want to get going on it now. It is only interim in the sense it would be replaced in due course by something more permanent. We have no desire to delay acquisition of the B-1B. In the procurement of the MX and the basing of the MX, in its interim basing mode; in improvements in command, control, and communications; and in procurement of the Trident submarines and accelerated research and development on the D-5 missile, we are going about as fast as we possibly can go and get value for the money expended.

Senator **Goldwater**. I realize that even with the vast sums of money that the President has approved, we are not going to be able to do the job with that much money. But I would like to see the Pentagon putting up a more determined position.

The MX has become a political thing, and now the defense of this country is not a political matter. We are now beginning to run into the political pressures that come from every adjutant general of every National Guard unit in the United States, writing the Members of the Senate and the House saying "We have to have more C-130's, and we have to have more A-10's."

We buy those things to placate adjutant generals and Governors, and the members of the Guard who are quite a political block. We don't need them. Yet we yield to political pressure.

MX BASING NEEDED

We need MX basing. But it shouldn't make any difference whether the people of Nevada or Arizona or Indiana need them. It is the defense of the United States and not one of the 50 States.

I would like to see us start acting like we are determined to defend the United States and not a certain number of the 50 States we have.

I didn't want to get into a lecturing mode, but I have been mad all weekend and I have had to blow off somewhere. I didn't blow off altogether, I am saving some of it.

Thank you, Mr. Chairman.

Senator **Quayle**. I hope you will let us know when you are going to blow up. I want to be there.

Senator **Goldwarer**. I am writing a tough speech. I am going to leave the Senate the day I give it.

Senator **Quayle**. I hope you give us advance notice so we will all be there.

Thank you, Mr. Chairman.

MX AND SIGNIFICANT STRATEGIC FORCE REDUCTIONS

I have a question related to your statement on START talks. You say we are preparing for them. I believe I quote you correctly, that you are talking about significant reductions in the START talks.

Now we have a problem with the MX basing mode, and there is a strong argument going around that the only reasons we need to proceed with MX is to use it as a bargaining chip as such in the START *talks, whenever* they begin.

I wonder what we would be asking the Soviet Union to give up if in fact we are willing to defer the MX?

Mr. PERLE. Senator Quayle, I didn't mean to suggest that our START talks would mean the end of the MX.

Senator WARNER. Does it go to the interim basing?

Senator QUAYLE. Ultimately to the missile itself and ultimately to whatever basing mode they come up with, but we keep hearing this argument, Mr. Chairman, that this is just to be used as a bargaining chip.

We have proceeded very slowly to develop a basing mode, and quite frankly I am skeptical whether we are ever going to get one. If that is the case, and we go to the START talks, I wonder what we would expect out of the Soviet Union if in fact we reduced the MX and don't go forward.

I think we ought to start talking about some of these things in lieu of all the rhetoric and the discussion on a nuclear freeze.

I certainly don't support it and I know the chairman doesn't, and I am sure Mr. Perle doesn't either. I think we ought to ask ourselves what would happen if the Soviets would accept a freeze? We would be in a very unfortunate situation. But I would like to start the dialog by looking to some of the specifics. We are talking about reduction and whether we would be willing to reduce or put off the MX. What would we expect the Soviets to give up?

Mr. PERLE. To be as plain as it is possible to be about it, I don't regard the MX as a bargaining chip. I think we need the MX because we presently have a land-based ICBM force that is vulnerable. Unless we negotiate with the Soviets for restraints on their offensive forces that would enable us to have confidence that our existing ICBM force could survive a Soviet attack, we will need to take some steps to correct the vulnerability of that force.

Senator QUAYLE. Now let us assume that you can get reductions from the Soviet Union on their missiles, in the event we defer the MX. You say it is not a bargaining chip, but let us take the situation, let me ask you this. What kind of reduction in the Soviet missile system would they have to take so in fact the MX could be a bargaining chip?

I am talking about reductions, and I hope you would couch your remarks in the concept of the zero option that is now being brought forth. I think that they, or I could be very amicable to the START talks. I just want to get some idea and some dialog going on what we are talking about.

What do we expect the Soviets are doing with their missile system? What would we ask, let me ask that?

Mr. PERLE. In theory if the Soviets were prepared to reduce their ICBM warheads, those that are capable of striking the hardened Minuteman silos and destroying them, to the point where we would have an adequate survivable Minuteman force, then under those circumstance one can imagine canceling the MX program.

Frankly, I doubt that the Soviets will be as responsive as this would require. I doubt that they will be prepared to go that far. My guess is that we will need to do two things. One is negotiate reductions that limit the scale of the threat——

Senator WARNER. What is that?

Mr. PERLE. The scale of the threat. That is, not eliminate it entirely but limit it, and second, design programs that recognize the limited nature of the threat. That would enable us to maintain a survivable force. A small force of MX missiles, with the Soviet offensive threat constrained, would be a good deal more survivable than a rather large current force of Minuteman missiles with the Soviet offensive force unconstrained.

So we are likely to need the MX under almost any circumstances of arms control.

The difference between MX as we see it now and MX as we might see it later is that with sufficient reductions on the Soviet side, a relatively small number of MX missiles might be quite survivable and require much less demanding and much less costly basing modes.

So there is potential for a very large advantage for a START agreement that limits the size of the Soviet threat.

START AND SIGNIFICANT STRATEGIC FORCE REDUCTIONS

Senator QUAYLE. Would we limit the size of Soviet threat by reducing the present capabilities? Isn't that what we are talking about?

Mr. PERLE. I think there are two things that work there. One is the potential growth which, in the absence of some kind of agreement, is almost certain to take place, and that growth, by the way, would have taken place even under the treaty previously, negotiated which is one of our concerns about that treaty.

The second aspect is how deep are the reductions we can achieve through negotiations. That is an issue that is now under examination in the interagency process. Personally, I would like to see quite significant reductions because if we could achieve balanced reductions, so that we could operate a strategic force with a smaller but more secure capability, we would be a good deal better off. Then for the first time it might be possible actually to save resources.

Up to now arms control has not saved resources and indeed in some cases it has driven up the costs of strategic programs. But with significant reductions it is possible, in theory at least, to plan, over the long term, a reduction in costs both for ourselves and the Soviets. I hope we can achieve that.

Senator QUAYLE. You keep saying significant reductions. Could you put that into specifics on both sides? What are we really talking about? Are we talking about their land-based missiles or their sea-based missiles, or their air-launched missiles? What are we talking about on our side when we talk about significant reductions?

Mr. PERLE. The focus of our concern, and we think it should be the focus of the Soviets' concerns as well, would be the most destabilizing systems. Clearly those are ballistic missile reentry vehicles, those warheads that can be delivered in a matter of minutes and threaten the survivability of our deterrent in the case of a Soviet weapon action and which potentially represent an analogous Soviet vulnerability.

Therefore in order to achieve stability the intial focus of any arms control discussion with the Soviets should be the destabilizing weapons, the ICBM's and SLBM's, but the ICBM's particularly. I believe that when we complete our interagency process, our proposals will reflect that concern.

As to the quantitative dimension of your questions, what is meant by "significant," I would rather keep this discussion in open session at a level of generalization, since this is one of the issues that is now being studied most closely and I think it would be a mistake to foreshadow the proposals.

NUCLEAR FREEZE

Senator QUAYLE. I understand, but I want to try to extract from you as much as I can in open session, because we are having a debate in this country, whether we like it or not, on a nuclear freeze and we are going to have a very contentious debate on arms control.

I think we need to discuss some of the strategies and some of the options we are going to pursue, and to do so openly, because we have to start now before the public momentum goes too far and this administration is put in the posture of appearing to be unconcerned about arms control or insensitive to the arms risk, which I know that you are not. But we have to do it in open session and I want to push a little bit further.

Will we make specific recommendations such as, the United States would be willing to zero out the MX if the Soviet Union will, and then list what the Soviet Union would have to do?

We are trying to talk about that, because if we are, then we are really going beyond the freeze and we are talking about reductions, and this is what I would like to know. I wonder if you could answer that?

Mr. PERLE. Senator, I doubt that we will make system specific proposals, by which I mean I doubt we will say that we are prepared to trade MX against the SS-18 on the Soviet side or some other such system.

What I expect we will do is talk in terms of aggregate numbers and leave each side free to decide which forces it would dismantle in order to meet the required levels permitted on either side. But in talking about significant reductions, I have in mind certainly going well beyond anything implied by a freeze.

Indeed, a freeze would be a great disappointment because it would mean leaving the level of strategic forces in the world at an extremely high level and in a dangerous and destabilizing mode.

The Soviets have today deployed many thousands of reentry vehicles, a significant fraction of which is competent to strike parts of our strategic force and destroy them. That is the principal source of the instability of the current strategic balance and it is this instability that we need most urgently to correct.

One way to correct it would be to have significant reductions, but not to acknowledge the offensive capability the Soviets have accumulated in recent years and to legitimize that by a bilateral agreed-upon freeze.

Freezing them in the position of superiority and freezing the current condition of instability would be, I think, a great mistake and a terrible disappointment.

Some very well-intentioned people who line up to sign petitions in support of that freeze, who believe that the freeze would make the world a safer place, simply haven't looked at the kinds of strategic forces on both sides that would be frozen in place under those circumstances.

So we might settle for a freeze only very reluctantly, after all efforts to achieve something better had failed, and with the recognition that the freeze would not increase the instability of the strategic balance.

Senator QUAYLE. Well, as I said earlier, if in fact we had put a freeze on the table and the Soviets would accept it, we would be in a very difficult situation, not only from the destabilizing point of view, but we would be, as you said, agreeing to an inferior balance. What we really need to direct ourselves to—my time is up, but I do have some other questions.

Senator WARNER. I have quite a few and if you just have one before you wrap up, you could go on. Other than that, I am going to go into about a half hour or hour development.

Senator QUAYLE. I don't have a half hour development so let me try one question.

Senator WARNER. If you want to take one or two, that is fine.

TITAN ICBM AGREEMENT

Senator QUAYLE. I would like to revisit the Titan issue for a couple of moments. Presently we are going to phase out the 52 Titans that have 9 megatons each.

Doesn't the fact that these Titans exist now give the Soviet Union some pause to think and should we really be proceeding down that route before we get some resolution on MX which is doubtful in the short term?

Mr. PERLE. Senator, I think the Soviets have assessed the utility to us and the threat to them of the Titan force. They surely are aware of the fact that it has become increasingly costly to maintain and increasingly difficult to maintain safely. They can see the writing on the wall and the writing on the wall is that those Titans cannot be kept in the inventory very much longer.

Under those circumstances, I doubt that we can trade them in for very much. They could be included in the context of the negotiation, but since the Soviets know we intend to phase them out and it is simply a matter of time, and not very much time, they would not be inclined to make much of a concession in order to accomplish their removal. Similarly we would not be inclined to make much of a concession in order to accomplish the removal of some old SS-4's and SS-5's that the Soviets are presently proposing to dismantle in the context of the Geneva talks.

One of Mr. Brezhnev's ploys has been to suggest that they are prepared to make reductions of their intermediate range ballistic missiles in Europe. What they have in mind are the SS-4's and

SS–5's. We don't take that very seriously because we know they are coming out anyway.

I don't think that they would take very seriously a prolongation of the service life of the Titans.

We have come to the conclusion that from the military effectiveness and safety point of view, they are better off retired and using the funds to modernize and operate them for other purposes.

Senator **QUAYLE**. How many Soviet missiles would it take to assure the destruction of the Titans?

Mr. **PERLE**. Something like the same number of warheads as there are Titans, plus a factor for reliability. Those Titan silos are softer than the Minuteman silos. I should think, to be very conservative about it, two warheads per Titan silo would give the Soviets high confidence that they could destroy the Titans, so we are talking about 104. This is a tiny fraction of the Soviet ability. The Soviets have some 7,000 ballistic missile warheads.

Senator **QUAYLE**. Won't they retarget these missiles on our Minutemen?

Mr. **PERLE**. They have more than enough, unhappily, to destroy the Minuteman and the Titans, and so at best, the cost of eliminating the Titans would be 104 weapons from their reserve.

Senator **QUAYLE**. Where would they retarget to?

Mr. **PERLE**. Well, if one assumes a carefully designed initial Soviet attack, it would entail something like two warheads on each Minuteman silo, 1,000 silos, then one is talking about a couple of thousand warheads.

To factor in the additional 102 warheads to attack the Titans, is an insignificant thing from the Soviet point of view. If they didn't use them on the Titans, they would, I believe, go into their reserve force, since they have more than enough for an initial attack under any circumstances.

MILITARY STRATEGY

Senator **QUAYLE**. I have one final question.

In the area of the strategy and so-called gap that has emerged between strategy and allocation of funds, I don't know if you had an opportunity to read in the Post this morning that article?

Mr. **PERLE**. I did indeed and it ruined my breakfast.

Senator **QUAYLE**. Maybe you could just critique that article for us, because basically it sort of underscored the debate that has been going on around here whether in fact we are building for fighting a war at every place on the globe. If in fact we are, there is no way that the Congress is going to be able to provide the resources to meet that kind of military strategy, and we would be very thin and potentially weak.

Now, you obviously disagree with that and I would like to explore why.

Mr. **PERLE**. Let me say it was a serious and thoughtful article and I am not going to criticize an article that I think made some good points, because it in turn was critical.

Senator **QUAYLE**. What good points did it make?

Mr. **Perle**. I think it is quite right in observing that our resources are not adequate to the task of fighting a global war everywhere at once with a high degree of intensity.

Where I think the article goes wrong is in attributing to the administation a strategy that the administration hasn't set for itself and a set of goals that we have not adopted.

We are under no illusion about the extent to which it will be possible to procure and maintain forces sufficient to deter the Soviet Union and to fight in several areas, but we will not be able to fight everywhere in the world at once at a high level of intensity. That is a simple fact and no one is under any illusion about that.

We would like to protect the flexibility to be able to respond where a response is necessary, since it is impossible to anticipate where a conflict might develop. That means some local reach, but it doesn't mean global coverage simultaneously.

Second, we would like to preserve the option, in the event of a conflict, of choosing how best to defeat the enemy, and that may mean opening an additional theater or an additional front. But again it doesn't mean fighting everywhere at all points. I think the article is a sound criticism of a strategy that we have not adopted.

Senator **Quayle**. Why is it that so many people have the idea that this is the strategy? I am sure if you have seen the testimony where some of, not the chiefs, but the advisory chiefs, chief planners testified before this committee, or the Preparedness Subcommittee, that they certainly didn't have nearly enough money to have this reasonable assurance, or whatever reasonable assurance means to them, but they were operating on that and they were way over the recommendation.

How is it that people like that get the idea that they ought to be spending more, and why is it that the idea that people like Mr. Record and other thoughtful analysts of the defense community feel that there is a huge gap between the so-called strategy and the amount of resources that we are willing to allocate? What seems to be the problem there?

Mr. **Perle**. There is no question that there are gaps in our ability to fight everywhere at once.

Senator **Quayle**. But is that our strategy?

Mr. **Perle**. That is not our strategy. I had the experience a while back of listening to the CINC's who came in from around the country to brief the Defense Resources Board on their requirements. It was a fascinating exercise. It took place over 2 days and they came from the Pacific, Atlantic, and Europe. They explained the missions as they saw them and the resources available to them.

In every case there was a gap, and in some cases a huge gap. The only thing wrong with that presentation of the issues was that they were each looking at it from a theater point of view. That is, from the Pacific point of view or Atlantic point of view or the central front or the European point of view, depending upon the responsibilities that the CINC happened to have.

When you sum all of this up you get an enormous gap. That is hardly surprising because each one of those gentlemen is looking at what he needs in order to prevail in his theater against the full force of the other side. But the other side has to divide its resources as well, and it can't be on the central front, the Atlantic and Pacific with its full force at any given time either.

What matters is our ability to fight real, in-being forces that one can credibly believe will be allocated to any given theater. If you assume that the full Soviet force can be allocated everywhere at once, then, from the point of view of any commander in the theater, the gap looks enormous.

The same thing happens when you sit down and do defense planning. The people responsible for strategic forces see the gaps in the strategic forces and the people responsible for land warfare see the gap in tanks or in armor and the people responsible for air defense see the gaps there.

When you put it altogether, however, we have a very large gap that doesn't reflect what the other side can bring to bear in any given theater. So it is a matter of disaggregation and we are not nearly in as bad shape when you disaggregate. We had a decade when the Soviets were building their forces and we were not, but we are going to correct that.

Senator WARNER. I wonder if we can get on back to this matter.

Senator QUAYLE. I wonder if we could get the strategy before us, and we can put this story to rest. Is there any chance of doing it because it has come up in the past and apparently it is going to keep coming up.

Is there any way that you can just outline what the strategy is to put this thing behind us, or are we going to be living with this from now until the next 3 years?

Mr. PERLE. We have the Secretary's posture statement which has a good deal of discussion about it. It might be useful to get a short version of our overall strategy. I would be glad to undertake to see if we could do that, and lay this to rest, because I realize that there has been some confusion about what our objectives are.

Senator QUAYLE. There has been a lot of confusion and I think that we need to, as quickly as possible, put this thing behind us and get it out in front and figure out who is right and who is wrong.

Senator WARNER. The position of the Senator is well taken. You can show what commitments we will abandon if we do in fact underfund this defense budget and it follows John Tower's line which I think is a proper one. In other words, cutbacks will mean force reductions and force reductions will mean lack of ability to meet all commitments.

Thank you, Senator, for a very helpful contribution.

NUCLEAR FREEZE

I mentioned this freeze debate. There was an interesting piece in the New York Times over the weekend on that freeze debate.

Did you have a chance to study that?

Mr. PERLE. I didn't find the numbers particularly illuminating.

Senator WARNER. I would like to have you provide the committee as promptly as you can, hopefully this afternoon or at the latest in the morning, the Department's response to the numbers that is easily understandable by the American public who don't have to deal with this question daily as we do, and are there any inconsistencies?

Mr. **Perle**. We will be glad to do that. Let me say that one of the distortions in the chart is that weapons and bombers are treated as though they were identical to ICBM missile warheads. Of course given the massive amounts of Soviet air defenses that is not the proper assumption. Yet if one looks closely at that chart a significant fraction of our total number of weapons are based on bombers.

[The information follows:]

STRATEGIC FORCE TRENDS

First of all, let me say that the Administration shares the same goals as the proponents of the nuclear freeze, namely to make even more unlikely the possibility of a nuclear conflict. To that end the Administration envisions deep reductions as part of an equitable and verifiable arms control process with the Soviet Union. Unfortunately, the nuclear freeze proposal would serve only to "freeze" the Soviet advantages accumulated as a result of their relentless drive for strategic superiority and will significantly reduce, if not eliminate, any incentive for the Soviets to agree to truly meaningful arms control measures.

Specifically, regarding the table, one would wish that greater care was given its formulation. For instance, if one adds the 5,500 ICBM and 1,900 warheads that the chart credits the Soviets (without confirming the accuracy of such a statement), one would expect that the appropriate bar graph would rest at 7,400. One is surprised that the actual bar graph indicates that the Soviets have approximately 6,300 ICBM/SLBM warheads. The difference of 1,100 warheads is rather significant and indicates the need to exercise care in relying on such ad hoc analyses. Most importantly, by unjudiciously aggregating nuclear systems the chart does not indicate the existence of destabilizing weapons systems, namely the high accuracy Soviet ICMBs which threaten the survivability of our Minuteman.

The attached chart provides correct comparisons of total U.S. and Soviet Strategic Nuclear Delivery Vehicles (SNVS), Warheads (WHDS), and Equivalent Megatonnage (EMT, which measures the destructive potential of an arsenal against soft targets, such as urban/industrial areas). The chart also shows, for ballistic missiles (SLBMs and ICBMs), the totals of SNDVs and Throw Weight (TW, expressed in 1,000 kg increments). Throw weight is an indicator of the ability of a force to deliver weapons on targets. The large Soviet advantage of missile TW gives them a potential means to deploy many additional warheads by fractionation, without building more missiles.

It is important to understand the significance of these "static" or pre-attack measures of U.S. and Soviet strategic forces. Strategic capabilities depend on numerous operational factors not reflected in these simple measures. To deter attack, we must have forces that can survive a Soviet first strike and retaliate effectively against targets of high value to Soviet leadership. Equality in pre-attack strategic indices does not necessarily imply that a balance exists or that U.S. forces are adequate to deter any possible use of nuclear weapons by the Soviet Union.

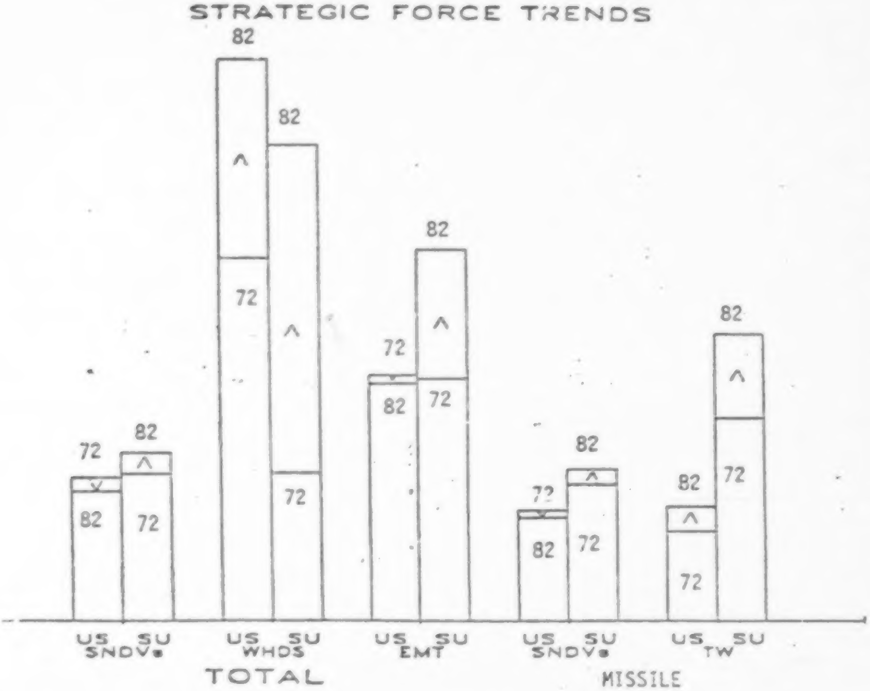
Moreover, as noted above, the Soviets have been continuously expanding and modernizing their strategic forces for well over a decade. The U.S., on the other hand, has been modernizing at a much slower pace.

As a result of Soviet improvements in missile accuracy, U.S. ICBMs are now vulnerable to attack. A freeze would deny us the ability to modernize and improve the survivability of our ICBM forces, while leaving intact Soviet counter-ICBM capabilities.

U.S. bombers are aging and are becoming increasingly vulnerable to Soviet air defenses. A freeze would deny us the ability to modernize our bombers and the weapons they carry, while leaving intact and permitting improvements in Soviet air defenses, which counter our bombers.

U.S. SLBMs, while quite strong today, face block obsolesence in the 1990s when Poseidon submarines must be retired. A freeze would deny us the ability to modernize our SLBM force to ensure the long-run strength of our sea-based deterrent.

Overall, a freeze today would lock in Soviet advantages, effectively cut off our plans to correct these imbalances and achieve a more stable deterrent in the future, and eliminate incentives for the Soviets to engage in serious arms-control negotiations. For these reasons, we do not believe that a freeze today would be in the best interests of the United States or in the best interests of our friends worldwide who share our goal of maintaining peace.



BMD DEFENSE OF MX

Senator **Warner**. Now I will return to the debate that I initiated here with you on the interim basing mode and the ability of the Congress to look at that in the context of trying to make some cuts.

Supposing we pursue this multiplicity of permanent basing modes which you and I do agree on. Is there not one of those options which is readily understood today and as such we could pursue with all haste to develop that option, recognizing that the other options that would be adopted under the multiplicity option would take more time. One example being the combination of an MX and ABM system.

We have explored every nook and cranny and I doubt that there is much left. Supposing we went to a military base, and there by minimizing the environmental impact considerations and things of that nature, and started in promptly on a pilot program to put one of those installations in for the MX?

Mr. **Perle**. Well, Senator, as you know——

Senator **Warner**. That is to advance one option under the multiplicity option and take time to develop the other permanent ones.

Mr. **Perle**. As you know, we would very quickly run into the limitations by which we are presently legally bound that arise from the ABM Treaty of 1972. Under that treaty we are permitted to deploy up to 100 interceptors. That is 100 interceptors under the most optimistic circumstances, circumstances where one fully exploited the leverage from preferential defense, would not impose very much of a penalty on the Soviets.

That is a relatively small number of interceptors and they could defeat that system. I, for one, would not hesitate to recommend modification of the ABM treaty if it were determined that the most effective defense of our strategic capabiliy lies in deploying ABM systems that are presently not provided for.

I frankly believe that we ought to approach the treaty issue before we begin to develop a system that could only be deployed in contravention of that treaty.

Senator **Warner**. Could we take the existing, whatever it is we have got on ABM and consolidate it with this one and dismantle the other one to fit the treaty?

Mr. **Perle**. Well, no matter what we sought to do, we would have to stop when we got to 100 interceptors, and that is the significant limiting factor in the deployment under present circumstances.

Senator **Warner**. I understand.

Mr. **Perle**. And I think I would be quite reluctant to start on a system before we had squared away the treaty issue. This is the year for an ABM treaty review. If the ABM option looks promising, this is the occasion on which we should begin to discuss that with the Soviets because defenses in this context are stabilizing.

Senator **Warner**. Well, now you have got it in the budget, if my recollection serves me, about $800 million for the ABM system and the R. & D. Has that line item become a target here now in view of what you are saying?

Mr. **Perle**. Oh, no, we are permitted under the treaty to pursue research and development and we certainly ought to do that. But the point will be reached where we will have to face the question of whether we can deploy, meaning a full strategic defense, under the existing terms of the treaty. Let me say——

Senator **Warner**. That is a lot of money to be spending if you are going to hold tight to the treaty and not be able to use the end product.

Mr. **Perle**. One of the dilemmas that these treaties pose for us is precisely that. You enter into a treaty and it prohibits deployment or permits research and development, and as time passes the Congress and the public grow weary of funding research and development on a system when the deployment of those forces are prohibited by treaty.

I share the frustration that arises from that, but I believe that this review in 1982 of the ABM Treaty is an appropriate occasion to raise some questions about the underlying logic of that treaty because the preclusion of strategic defense as that treaty entails is, in my judgment, destabilizing. It was a mistake in 1972 and the sooner we face up to the implications of recognizing that mistake the better.

Senator **Warner**. Are you inferring that an abrogation might provide a greater benefit to the Soviets than to the United States as of today?

Mr. **Perle**. One of the things that has happened in recent years is that the Soviets, uninhibited by public concern, have vastly increased their investment in ABM research and development to the point where the advantage we possessed at the time the treaty went into effect has been significantly eroded.

I can't make a judgment as to whether they would be better off than we. Frankly, we do not possess the kind of offensive threat that would require them to need an ABM system in order to protect the survivability of their deterrent.

We, on the other hand, are faced with a threat that requires some action on our part. Even though the Soviets may be better poised in the near term to deploy defenses, this does not necessarily mean that it would be in their interest to do so.

START NEGOTIATIONS

Senator **Warner**. I am just going to make an observation. I started my day with a meeting with some of my colleagues who are on the Kennedy-Hatfield resolution to indicate to them that I and others have a present intention to introduce a second resolution, again the goal being the reduction of arms, but recognizing that our view is that a freeze now would provide the instability and lack of symmetry that we have all discussed.

Frankly, my colleagues, at least one of them whom I respect highly on the Kennedy-Hatfield resolution, said to me that they just lack a feeling that this administration is proceeding with sincerity toward arms reduction. Therefore, the resolution sponsored by Kennedy and Hatfield was a "prod" toward the administration.

That is a problem of what we are up against here. That is an observation passed on to you and we have talked at length this morning about the sincerity of the administration, but somehow that message is not being heard and understood here.

I think it is the responsibility of myself and others to see what we can do to be more persuasive.

Mr. **Perle**. I can assure you, Mr. Chairman, that we are working very hard to develop a serious and thoughtful arms control proposal.

We worked very hard to develop the proposal that has been put to the Soviets at Geneva and we inherited from the previous administration the enthusiasm for arms control out of all proportion to the skill with which negotiation were conducted, or results achieved.

We inherited an approach to the Geneva negotiations that was so overwhelmingly political and shallow in nature that there was nothing we could work with, and we had to start from the beginning, even though one round of talks had already taken place. We took some time to do that and we were criticized for dragging our feet, but the fact is it took that time to come up with a sensible proposal.

I think we did come up with a sensible proposal. We are endeavoring to do the same thing with respect to the START negotiations. I reject the notion that we are not sincere about it. If we were insincere, we could rush to the table with some ill-designed and hastily thrown together proposal, but we have chosen not to do that.

Senator **Warner**. That is correct and I think there is some danger in the Congress of the United States trying to prod the administration into a timetable which, in its judgment, is unrealistic.

I certainly am not going to be a part of that move nor will I ever be because I recognize the constitutional responsibility that the President has as chief of foreign policy and spokesman for the United States.

Nevertheless we are being overtaken by events. The resolution seeks the freeze. I take it quite seriously, and I am concerned about seeing some of my colleagues go too far out on a limb without an alternative. That is one of the reasons I will be looking at the second type of resolution.

Second. I think the public is clamoring rightfully for some action in this area, and so even though you want to remain firm and I think you should remain firm on a timetable, we have to do a better job of convincing the Congress and the American public of the sincerity of your approach.

Mr. **Perle**. I think we are very close now, Senator, to development of a proposal that we will be able to take into those negotiations at an early date. I think we are making sufficient progress so that it will have been worth waiting for.

Senator **Warner**. I don't think it is necessry for you to divulge at this point the exact dates, and although the Secretary said it was in the summertime, and as you say the numbers and things like that, and maybe there is an interim message that you have to put out with more sincerity. We can deal with that at another time.

In that context of course there is a shortage of articles on this subject and I will address the debate which appeared in the Times over the weekend between Mr. Rostow and Mr. Warnke here momentarily, but there is also the Pincus Plan which has caught the eye of a good many people.

Do you have some comment on that? I know you have known Walter for years and he is regarded as a student in this area.

Mr. **Perle**. The spirit of significant reductions is one that is shared. As to the details of the plans, Senator, I must admit to you that I am working with those numbers 5 days a week, and I couldn't quite bring myself to do it on Sunday as well and so I haven't read the article. But I gathered from looking at the Outlook section that it proposes significant reductions and that certainly is consistent with our approach.

MX DEPLOYMENT IN CONTINUOUS PATROL AIRCRAFT

Senator **Warner**. Can you provide evidence to support your claim that the Soviet Union has diverted resources to address the problem of Big Bird deployment of an MX?

Mr. **Perle**. I am assuming that they have because it would be the natural reaction one would expect, from the earliest point at which they began to hear about it, after the Towne's panel indicated that we might go to a system like the Big Bird.

I imagine they put their planners on the problem of how to counter it, but I don't have any evidence that they have done so. I inferred that from the quality of the situation. I know we would do it if we saw indications of the Soviet program for which we had no counter. At the very least we would begin to examine ways that it could be done.

NEED FOR MX INTERIM DEPLOYMENT

Senator **WARNER**. Do you feel you have had adequate opportunity to answer the question of the impact of a delay of introduction of MX on the phasing of moderniziation of the overall program?

Mr. **PERLE**. Yes; you have given me the opportunity and I don't know how well I have responded to that opportunity.

Senator **WARNER**. I want you to go into that very seriously after this session because we are giving you an opportunity to supplement the record, but this is going to be a very lively discussion within this subcommittee at the markup time.

As I have indicated to you, I am considering seriously the options, as I have indicated earlier, of eliminating this program—the interim program—and concentrating on one of the elements of a multiple permanent system and bringing it forward and advancing it and proceeding with the others.

Mr. **PERLE**. I believe, I may say, Senator Warner, that there is no reason why the interim basing could not ultimately become a part of the long-term deployment if it were defended with a ballistic missile defense. So that it is not a foregone conclusion that the investments in the conversion of those Minuteman silos will be only a short-term proposition.

Senator **WARNER**. Of course, despite my distinguished colleague, Mr. Goldwater's statements earlier, there is a little problem there of enormous magnitude. That is when you consider the land that would have to be utilized for that adjunct, the prime agricultural land of America, is there not, much of it?

Mr. **PERLE**. I believe our experience has been that the amount of land withdrawn from public use for deployments of this sort is relatively modest. It may cover a broad area, but within that broad area the amount of land actually consumed by the deployment is quite small.

The original MPS system, with 4,600 shelters would have caused the withdrawal from public lands of only 125 square miles of land.

MX AND TRIDENT II

Senator **WARNER**. I have walked every bit of it and I know exactly what you are saying. You bargained that among other things the difference in IOC's of the two systems, Trident versus MX justifies going forward with both? What happens if that difference is reduced by acceleration of the D-5 IOC and the delay of the MX?

In other words, that phasing period is reduced by one or the other of those actions or both actions?

Mr. **PERLE**. It is conceivable that if one goes faster and the other goes slower, they could be available at approximately the same time. They are being optimized for different purposes, however, and it is not by any means clear that the D-5 could be suitably deployed in a land-based mode.

There is no incentive to try to make the MX deployable in a sea-based mode. They are likely to be different systems even though they will share some characteristics in common, principally high accuracy.

SSBN DISMANTLING

Senator **WARNER**. What are the DOD plans with regard to dismantling the strategic launch systems as the U.S.S. *Michigan* goes on sea trials this summer?

Mr. **PERLE**. That is presently under discussion, Senator, and no plan has yet been developed, but all options have been carefully held open.

Senator **WARNER**. Do we continue to abide by SALT ceilings which would require dismantling of Polaris submarines now being used as attack boats?

Mr. **PERLE**. We are looking at the question of what we ought to do with those boats. One possibility would be to convert them to other purposes and there are procedures under the treaty that would enable us to do so. We have not yet decided on whether to convert them or simply dismantle them, however, or to do something else with them. But it is under investigation.

Senator **WARNER**. Can you do it under the treaty?

Mr. **PERLE**. Oh, yes, there are treaty provisions for conversion.

SOVIET VIEWS ON ARMS CONTROL

Senator **WARNER**. Let us go on. Did you read this article over the weekend, the debate between these two gentlemen?

Mr. **PERLE**. I did, yes.

Senator **WARNER**. Mr. Warnke stresses a point that heretofore has not been given quite the stress I feel he has given it that is, that the Soviets were more serious about arms control than the United States for the reason that their political system is more fragile than that of the United States.

He coins a phrase, that Moscow would disappear under an attack and there would be dancing in the streets of the Ukraine and the other areas.

Do you want to comment on that?

Mr. **PERLE**. That is an intriguing hypothesis.

Senator **WARNER**. I found it intriguing, also.

Mr. **PERLE**. I observed a little earlier that the Soviet leaders are not ashamed about going to great lengths to save their own skins: That is what they think about first. All of the indications of their civil defense preparations suggest that.

This entirely theoretical proposition by Mr. Warnke cannot be demonstrated one way or the other. It is a novel idea.

If it were true and the Soviets were serious about arms control they would have been more responsive to the proposals we put forward at Geneva. So I don't agree with his conclusion, or the reasoning, and I think it is pure speculation.

SEA-LAUNCHED CRUISE MISSILES

Senator **WARNER**. Further down, he talks about the idea of sea-launched cruise missiles on a general-purpose submarine as being a poor idea. Since SLCM's are a part of this budget we are considering, that argument might arise at some point in this debate.

Do you want to put in the record your views on the sea-launched cruise missiles?

Mr. **Perle**. I would be glad to do that.

Senator **Warner**. And you should put some emphasis on their implications in the arms control arena.

Mr. **Perle**. In fact, Mr. Warnke's objection to sea-launched cruise missiles and his concern with sea-launched cruise missiles derives from the belief on his part that they will complicate the process of arms control, although he has chosen in the debate with Gene Rostow to criticize them on the ground of military effectiveness.

I believe a small number of sea-launched cruise missiles interspersed in the attack submarines greatly complicates the Soviet defense management problem and could add significantly to our deterrent capability.

The arms control implications are interesting.

Inclusion of SLCM's in arms control agreements would pose difficult verification problems which could be associated with monitoring the number, armament (nuclear or conventional) or range capability. It should be recognized that SLCM's are already deployed in the forces of the Soviet Union and therefore these problems could exist regardless of U.S. plans for such systems. Cruise missiles in general, including SLCM's, are important elements of the U.S. conventional and nuclear forces required to maintain peace.

SOVIET NUCLEAR DEPLOYMENT IN CUBA

Senator **Warner**. I will ask the question, you have watched the unfolding of Mr. Brezhnev's latest statement and the Secretary of Defense's response, and now the reemphasis of the threat that they would, in the event we went forward with the European augmentation, endeavor to put some basing of comparable systems in the area of Cuba.

How do you answer the argument that, well, if we are able to put our systems in Europe, we, in a sense, are a threat to certain portions of the Soviet Union, then they should be able to put a comparable system here in this hemisphere, posing a similar threat?

Mr. **Perle**. Let me say first that the Brezhnev statement was really quite vague as to what he had in mind and I still don't know what he had in mind.

Senator **Warner**. We all read it and reread it and we heard the President talk about it and nevertheless he has come back and he has restated it or certain sources have, in a fairly unequivocal manner.

Mr. **Perle**. There are two issues. First of all, the introduction of Soviet missiles in Cuba would violate an existing agreement that was reached in 1962 under crisis conditions. It would be easy to dredge up that crisis atmosphere again, and I should think the introduction of Soviet missiles into Cuba would have that effect.

Senator **Warner**. Are we going to rely solely on that agreement and how binding is it?

Mr. **Perle**. We believe it is quite binding. It has been allowed in recent years to deteriorate some, but certainly not with respect to nuclear missiles in Cuba.

Three or four years ago, the Soviets were encroaching upon that agreement in the submarine area and we should have taken a more firm position, but with respect to missiles, there is no question about what that agreement provides.

Beyond that, I reject the notion that this is comparable to what we are proposing to do in Europe. The fact is that in Europe the Soviets presently have well over 1,000 warheads deployed capable of striking all of NATO territory and we have none.

The score stands at 1,000 to 0, or 1,100 to 0, and all we are proposing to do is provide a partial response by deploying 572 modernized systems in Europe and we are prepared not to do that if the Soviets will dismantle theirs. So the suggestion that the only way balance can be achieved is by the introduction of offensive Soviet weapons in Cuba is just nonsense.

What the Soviets are doing is trying to provide cover for the fact that they have aggressively persisted and built up a capability in Europe for which we have no counter.

Senator **Warner**. Mr. Secretary, I think that concludes the questions that we had and feel free to add materials for the record.

Again, I wish to thank you and your colleagues for assisting this subcommittee in its work toward preparation of the markup before the full committee. Thank you very much.

The hearing is adjourned.

[Whereupon, at 11:35 a.m., the hearing of the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEAR 1983

MONDAY, MARCH 22, 1982

U.S. Senate,
Subcommittee on Strategic and
Theater Nuclear Forces,
Committee on Armed Services,
Washington, D.C.

SOVIET CHEMICAL WARFARE

The subcommittee met, in open session, at 2:10 p.m., pursuant to notice, in room 1202, Dirksen Senate Office Building, Senator John W. Warner (chairman) presiding.

Present: Senators Warner, Quayle, and Nunn.

Staff present: Frank J. Gaffney, professional staff member; Paul C. Besozzi, minority counsel; George K. Johnson, Jr.; and James C. Smith, professional staff members; and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner; Jim Dykstra, assistant to Senator Cohen; and Paul Schreiber, assistant to Senator Denton.

OPENING STATEMENT BY SENATOR JOHN W. WARNER, CHAIRMAN

Senator Warner. The Subcommittee on Strategic and Nuclear Forces continues its review on matters which bear upon the U.S. chemical warfare deterrent posture.

The subcommittee has already had an in-depth set of hearings with witnesses from the Department of Defense and the military services on the President's comprehensive program for preventing the outbreak of chemical war.

Today we are continuing our efforts to prepare a balanced and complete record on these issues with representatives from the U.S. Government and outside witnesses. We will hear first from officials of the Department of State and other Federal agencies concerning a profoundly troubling matter relating to the threat of chemical warfare.

For quite some time allegations have been made that the Soviet Union and its allies have been employing chemical weapons in Southeast and Southwest Asia. In recent months the evidence has mounted supporting these contentions and new ones suggesting the use of biological toxin weapons.

The United States, through the efforts of, among others, a number of individuals who will appear before the subcommittee today, has taken the lead as a nation in trying to inform the community of nations about these chemical and biological attacks. To date these efforts have fallen short of the goal of bringing such attacks to an end. Defenseless people of Afghanistan, Laos, and Kampuchea, whose only offense has been their yearning for freedom from foreign domination, continue to be subjected to horrific Soviet and Soviet-proxy attacks employing lethal chemical and biological weapons.

Our hearing this afternoon coincides with the release by the Department of State of the most complete documentation to date, in some cases provided from previously classified information, of the crimes against humanity and the violations of international law of which the Soviet Union stands accused.

It is the subcommittee's hope that by having this session as a part of its considerations of the threat of chemical warfare and the need for the U.S. preparedness to meet this threat we can accomplish two purposes.

First, we can encourage the international community to press with renewed vigor for an immediate cessation of the use of these weapons by the Soviet Union and its allies.

Second, we can make clear to the American people the urgent requirement for a verifiable global chemical disarmament agreement. Commonsense dictates that until such a treaty is achieved banning all the world's chemical stockpiles, the United States must, and I repeat the United States must, maintain a credible chemical retaliatory capability. Without such a capability there can be little doubt that the United States and allied personnel could one day face the terrible fate being experienced even now by the peoples of the aforementioned countries, a fate which will be documented this afternoon.

Soviet use of chemical weapons in the Third World is not an issue which concerns only Americans. Far from it. People everywhere who repose their hopes for a peaceful world in the promise of arms control must view with horror and alarm the evidence to be presented today of inhumane and genocidal Soviet attacks and international treaty violations.

Neither is this evidence in and of itself a justification for the United States to replace obsolescent and dangerous unitary chemical munitions with safer binary weapons. Rather, the binary program is one which the President has decided is essential to the national security and which testimony taken by the subcommittee has strongly indicated is long overdue.

However, proof of Soviet capabilities and, more importantly, Soviet willingness to employ toxic chemical weaponry when and where it suits their purposes to do so can hardly be disregarded when considering this country's requirement for an effective and credible chemical deterrent.

In our second session we will have two panels of nongovernmental witnesses who will address themselves to questions related to chemical warfare and associated topics.

The first panel will consist of Dr. Matthew Meselson, professor of biochemistry at Harvard University, and a prominent critic of the proposed binary modernization program. Dr. Meselson will be accompained by Mr. Fred Swartzendruber, former Laos representative of the Mennonite Central Committee, who will comment upon the allegations made concerning the use by the Soviet Union of lethal chemical and toxin weapons in Southeast Asia.

Our second panel consists of two preeminent scientists, Dr. John Deutsch of the Massachusetts Institute of Technology, former Chairman of the Defense Science Board on Chemical Warfare held in the summer of 1980, and Dr. John Baldeschwieler, professor of chemistry at Cal Tech.

These two sessions will, it is hoped, provide a stimulating and valuable commentary on the testimony previously taken by the subcommittee on these highly important matters.

Secretary Burt, you and your associates are to be commended for your conscientious efforts to bring this troubling material to the attention of all concerned. The evidence you have accumulated I am sure has not only been very helpful to those of us trying to obtain the support here in the Congress for the President's program, but it has been a very dramatic revelation to the world.

Mr. Secretary, you may proceed.

STATEMENT OF RICHARD BURT, DIRECTOR, POLITICAL MILITARY AFFAIRS, DEPARTMENT OF STATE, ACCOMPANIED BY GARY CROCKER, BUREAU OF INTELLIGENCE AND RESEARCH, DEPARTMENT OF STATE; MICHAEL MATHESON, OFFICE OF THE LEGAL ADVISER, DEPARTMENT OF STATE; SHARON WATSON, MEDICAL INTELLIGENCE AGENCY, ARMY SURGEON GENERAL; CAROLYN STETTNER, ARMS CONTROL AND DISARMAMENT AGENCY; AMORETTA M. HOEBER, PRINCIPAL DEPUTY ASSISTANT SECRETARY (RDA), DEPARTMENT OF THE ARMY

Mr. Burt. Thank you, Mr. Chairman.

I would like to congratulate you first for what I thought was a superb opening statement.

Before I begin with my brief opening statement, I would just like to introduce the other members of the panel here today. On my left is Mike Matheson of the State Department; Gary Crocker, on my right, of the State Department; Sharon Watson, who works for the Army Surgeon General; and Carolyn Stettner of the Arms Control and Disarmament Agency.

Mr. Chairman, I am pleased to meet with you today on a subject of great international importance. For several years administration witnesses have been appearing before Congress to express growing concern over reports of the use of chemical weapons in Southeast Asia and Afghanistan. Each time more evidence has been provided, more information made available and more certain judgments offered.

SOVIET USE OF CHEMICAL WEAPONS

Today we take another step in this process, perhaps the most important to date. Today Secretary Haig has sent to the Congress a comprehensive report on chemical weapons use by the Soviet Union and its allies in Laos, Kampuchea, and Afghanistan. This report represents months of labor by those who drafted it. Most importantly, it represents 7 years' effort by a larger number of people, including American officials, private individuals, journalists, and representatives of other governments, to collect and analyze information on the use of chemical weapons in some of the most remote and inaccessible areas of the world.

The judgments contained in this report are unequivocal. Based on information dating back to 1975, the U.S. Government has concluded that selected Laotian and Vietnamese forces operating under Soviet supervision have, since 1975, employed lethal chemical and toxin weapons in Laos; that Vietnamese forces have used lethal chemical and toxin agents in Kampuchea; and that Soviet forces have used a variety of lethal chemical warfare agents, including nerve gases, in Afghanistan since the Soviet invasion of that country in 1979.

I can recall few, if any, occasions on which all relevant agencies of the U.S. Government have agreed more completely on less equivocal judgments. Those who have followed this issue over the years may not be surprised either by the substance or the straightforward nature of these conclusions. After all, the Carter administration 2 years ago had concluded that lethal chemical weapons were almost certainly in use in Laos, probably in Kampuchea and possibly in Afghanistan.

By the middle of 1981 the U.S. Government had concluded that lethal chemical weapons were certainly in use in all three countries. These judgments predated the results of analysis of physical samples from Kampuchea released last September which revealed that toxin weapons were one of the agents in use. Over the last 6 months further evidence of toxin weapons use has mounted steadily.

On the other hand, those who have not followed these developments closely or who have formed the impression from press reports that evidence of chemical weapons use consisted of no more than a single leaf and stem should be struck by the extent of information in this report and by the variety of sources from which it is drawn. There are some who will never be persuaded, but this report leaves them little to justify their skepticism.

It has sometimes been said that evidence of chemical weapons use is largely circumstantial. This new report demonstrates that the use of chemical weapons in Laos, Kampuchea, and Afghanistan has repeatedly been confirmed through firsthand accounts by those who have been its victims and by those who have been its perpetrators.

It has sometimes been argued that evidence of chemical weapons use derives largely from self-interested and therefore unreliable sources such as the Khmer Rouge in Kampuchea. The report we have submitted today demonstrates that the U.S. Government has credited reports from such sources only when they have been corroborated and recorroborated by information from multiple other sources and from other methods, including national technical means.

This report also shows that the great bulk of the reporting has come from unsophisticated peoples, including children, who could not plausibly have fabricated their stories nor arranged for these stories to be consistent over the years and over the thousands of miles which separate the respective areas of conflict.

It has sometimes been argued that reports of chemical weapons use could not be credited until the types of chemical agents in use had been positively identified. We have now positively identified one of the agents in use in Southeast Asia, a compound of trichothecene toxins. The report we have submitted also contains extensive information pointing to the identity of many of the other lethal and incapacitant agents in use in Afghanistan and Southeast Asia.

Many will concede that the evidence of chemical weapons use is compelling, but maintain that the link to the Soviet Union is weak. Certainly much of the information which directly implicates the Soviet Union is of the most sensitive sort. Yet, with this report there is now substantial evidence on the public record that the Soviet Union is directly engaged in chemical warfare in Afghanistan and is advising, supplying and supervising chemical warfare in Southeast Asia. The report also notes there is not a shred of evidence to support any alternative hypothesis.

I need not go into detail on the contents and conclusions of this report. It is available to you all. I hope you will find the time to read it. I hope you will encourage your constituents to do likewise.

INTERNATIONAL LAW AND AGREEMENTS

I would, however, like to say a few words about the fundamental questions which the findings in this report raise. How are these activities to be stopped? Are international laws and international agreements being violated? And, if so, what can we do about it?

International law and solemn agreement are indeed being violated in Afghanistan, in Laos, and in Kampuchea by the Governments of Vietnam, Laos, and the Soviet Union. The use of chemical, including toxin, weapons is a violation of the Geneva Protocol of 1925 and of the customary international law which has grown out of that agreement. The production, storage and transfer of toxin weapons are also clear violations of the 1972 Convention of Biological and Toxin Weapons.

What is to be done? International law of course is not self-enforcing. The Geneva Protocol of 1925 contains no provisions to verify compliance or to deal with noncompliance. Neither does the 1972 Biological Weapons Convention contain measures for verification.

That agreement does oblige parties to consult and cooperate in solving compliance problems, something the Soviet Union has consistently refused to do.

That convention also provides that action may be taken to resolve compliance issues by appropriate United Nations bodies and we have accordingly taken the issue to the UN General Assembly.

The convention does also specify that complaints may be taken to the Security Council of the United Nations. This is not a very satisfactory procedure, however, when the complaint is occasioned by the activity of a veto-wielding permanent member of the Security Council. For this reason we have to date concentrated our attention on securing UN General Assembly action on this issue where there are no vetoes. We have not foreclosed, however, the possibility of bringing the issue to the Security Council.

ARMS CONTROL AGREEMENTS

In the future we must obviously insist that any new arms control agreement contain measures which insure strict verification and guarantee that questions of compliance are dealt with seriously. We may also consider how existing arms control agreements, not just in the chemical weapons area, can be strengthened, both with respect to verification and to compliance. But these steps will not put a stop to the illegal and immoral campaign of chemical warfare currently underway against the peoples of Afghanistan and Southeast Asia.

The Soviet Union and its allies will not be deterred by legal argument, by diplomatic note or by UN resolution. Their acts will only be halted by a sustained and general expression of outrage from the entire international community.

Progress is being made in this respect, but it is painfully slow. Canada, like the United States, has submitted information to the United Nations on evidence of chemical weapons use. Seventy-seven nations voted in 1980 to initiate a UN investigation into these allegations. In 1981, 86 states voted to continue that investigation.

Unfortunately, the soviet official who is an Under Secretary General of the United Nations has already tried to impose obstacles to the conduct of this investigation. The United States will continue, nevertheless, to press for a complete inquiry and to make available all possible information at our disposal.

Other governments are becoming engaged in the process of analyzing physical samples from Southeast Asia thought to contain toxins. Last October we dispatched a Government team to European capitals to consult with our allies on the issue of chemical weapons use. It is our hope that the report we have today submitted to Congress, which will also be provided to the United Nations and all its member nations, will stimulate similar such initiatives on the part of other nations.

Later this week a team of U.S. officials and experts will leave for NATO and other key regional capitals to meet with allied and other governments on this issue.

DEEP CONCERN OVER CHEMICAL WEAPONS

As in our country, concern over the use of chemical weapons is growing in Europe and elsewhere. Let us recognize, however, that abroad, as at home, one encounters a persistent reluctance to face up to the fact that one of the most widely accepted norms of international behavior is being callously, flagrantly, and repeatedly violated.

If we are to secure the rule of law in the affairs of nations, we must condemn its absence. If we are to negotiate in good faith, we must react when faith is broken. If we are to achieve through new arms control agreements a safer world, we must move vigorously to preserve the integrity of those international instruments we already have.

These imperatives are not for us alone. They exist for all who share the objective of a more peaceful world order. We can point the way, but it will avail little unless others follows.

Thank you, Mr. Chairman.

Senator **Warner**. Mr. Secretary, we would like to hear from your colleagues if they have statements.

Mr. **Burt**. I think, Mr. Chairman, we are ready for any questions or statements you might have. They are here to answer questions on any set of issues relating to this question.

SOVIET RESPONSE

Senator **Warner**. This report and statement constitutes a very severe indictment against the Soviet Union. To what extent have they issued any denial, and I recognize this one has arrived today but it is predicated on material heretofore released, but to what extent have they issued any denial and provided any rebuttal evidence?

Mr. **Burt**. Well, Mr. Chairman, they have consistently denied any involvement in chemical or toxin weapons attacks in Afghanistan or Southeast Asia, both in public and in private diplomatic exchanges. In fact, as I pointed out in my statement, they have not participated or cooperated in the UN inquiry which is now underway. Efforts to have the UN investigative team visit Afghanistan, Laos, and Kampuchea as well as Vietnam have been vetoed. They have not been able to gain access there. As far as I know, they have just simply flatly denied these charges or suggested that perhaps these attacks are somehow the result of the United States and the U.S. presence in Southeast Asia during the Vietnam period.

Senator **Warner**. So not only have they declined to avail themselves of various international procedures by which they could rebut this indictment, but they have not been forthcoming with any tangible evidence, medical or other, to disprove these allegations?

Mr. **Burt**. Well, that is right, Mr. Chairman. Recently I attended a conference in Germany where there was a Soviet medical official present. He said that there was absolutely no proof of Soviet involvement, and then, as I stated before, went on to argue that anything that was occurring in Southeast Asia was probably the result of U.S. weapons which had been left behind after the Vietnam war effort.

Senator **Warner**. What lessons should we draw from your finding with regard to requiring onsite inspection in any further arms control agreements?

Mr. **Burt**. Well, we have not reached any specific conclusion concerning onsite inspection, but we have drawn, I think several lessons concerning the broader question of verification. I think two are worth highlighting.

VERIFICATION

The first is that arms control agreements that do not contain verification provisions and do not provide mechanisms for compliance are of little use. This is one reason why we have to take a hard look at the 1972 Biological Weapons Convention and think very seriously about efforts to improve it, it and other existing arms control agreements that do not provide for compliance.

Second, in future arms control negotiations, not simply in the chemical weapons area, but in other areas, we must make verification a key concern in our drafting of treaties and in the negotiation of new agreements.

Senator **Warner**. Absent a reliable verification provision then it would be your recommendation that we not try and do an arms control agreement in the chemical weapons area?

Mr. **Burt**. Well, we are supportive of chemical weapons arms control. In fact, we recently instructed our delegation at the Committee on Disarmament in Geneva to enter into discussions with other governments represented at that conference to elaborate a chemical weapons agreement, but we have also instructed that delegation to place special emphasis on the problem of verification which is exceedingly difficult in the chemical weapons area. We are also working closely with allied governments such as the Federal Republic of Germany on the problem of verifying a chemical weapons agreement.

I think I don't need to tell you how difficult that is because we are talking about an industrial capacity which can be used easily to produce peaceful, benign chemicals as well as weapons of war. We all recognize that any chemical weapons agreement that is worth anything would have to have a verification capability which was very, very intrusive.

Senator **Warner**. Senator Quayle?

Senator **Quayle**. Thank you very much, Mr. Chairman.

First of all, I certainly want to pay tribute to your leadership on this issue. You have been very up front. I also want to thank you for the position you have taken in trying to get as much information before the public as possible.

INFORMATION PUBLISHED

Mr. Secretary and others, I think that it is absolutely imperative that we give as much information as possible on this issue to the American people. We now have this report from the Secretary. There have been other reports that have come forth in the past weeks.

My question to you is, now that you have released this report on information that we have on chemical warfare in Laos, Kampuchea, and Afghanistan, what percentage of information still remains classified?

Mr. **Burt**. I am going to ask Mr. Crocker to deal with that question.

Mr. **Crocker**. Looking at all three countries, I believe that on Laos we have released just about as much information as we possibly can. We may not have identified the source, the specific source of the information in a couple of cases where it is very sensitive, but I guarantee you that every bit of information we have on Laos appears in this document or we can make it available.

Senator **Quayle**. That is what, 99 percent then?

Mr. **Crocker**. I would say that you have here almost all of our information. And, if not, we can provide it. It is readily available. I would say almost the same for Kampuchea. There is some sensitive information there, but again it is mainly the sources and methods.

We have provided the substance. This is also true to some extent for Afghanistan, but I would have to say in that case there is a higher percentage of sensitive information that we cannot reveal. We are not talking about 80 percent or anything. I don't know how to put a percentage on it.

Senator QUAYLE. Are you talking about half, about half that you can't reveal?

Mr. CROCKER. I would say we have revealed more than half of the information. Again, there are more sensitive sources involved in Afghanistan.

Senator QUAYLE. What classes of information are we talking about that you can't reveal in Afghanistan? Can you describe that for us?

Mr. CROCKER. Well, obviously sensitive sources or people that we can't identify because their lives would be in danger and national technical means. We have obviously been monitoring Soviet military activity there for over 2 years now. We certainly don't want to reveal how we collect that information.

It was very important when we put this study together that we would take the testimony, say, of Mujahidin coming into Pakistan and check this against our information on Soviet military activity. In other words, if they said there was a helicopter attack that dropped chemicals, did we have information that the Soviets did conduct a chemical raid in that area at that particular time? We found that a large percentage of the time we could verify with our sensitive information that there was an attack.

Now we have provided in this report, we have stated that the Soviets conducted an attack at that time. We can't tell you exactly how we got the information.

Senator QUAYLE. Have you given this to the Soviet Union, this report? Have they seen this?

Mr. BURT. We have not as of yet, but they will be given a copy, as will every other member of the United Nations today. Jean Kirkpatrick, our permanent representative to the U.N., has provided copies of this report to the U.N. Secretary-General for the U.N. group of experts investigating chemical weapons use and for all member states.

Senator QUAYLE. On page 1, I believe it is, you say the U.S. Government has concluded that selected Laotian and Vietnamese forces are operating under Soviet supervision and have since 1975. When you are talking about operating under Soviet supervision, what do we mean?

HOW THE CHEMICALS ARE DISPENSED

I guess, first of all, we ought to clarify for the record on how these chemicals are being dispensed.

Mr. BURT. Well, Senator, let me first of all answer the question about how they are dispensed. It is discussed in detail in this report, but I think the best way to answer that question is to read from the report a passage from an East German military manual which was published in 1977 which describes out of the horse's mouth, for example, exactly how the Soviet bloc military perspective has been formed on these weapons.

Senator **Quayle**. Is this from Major Siegfried and Major Franke?

Mr. **Burt**. I think it is, yes.

Senator **Quayle**. We have that. I just want you to summarize it for the public on how it is being dispensed, by planes or whatever?

Mr. **Burt**. As far as we know, it is either fabricated for use in shells——

Senator **Quayle**. Artillery shells?

Mr. **Burt**. Artillery shells. It is sprayed, it is in an aerosol spray, from aircraft and bombs.

Senator **Quayle**. Now then, where do we get the Soviet supervision? Are the Soviets flying those planes? Do they have control over those planes? Do they perform maintenance on those planes? What kind of supervision do we have with the artillery shells? Are they supervising the loading of them? Also, if you can establish the link back to the Soviet Union or somewhere where these things are being made.

Mr. **Burt**. Well, again, I think it is best to just simply refer to the report. Let me say something generally. We have, and it is addressed in the report, numerous examples of Soviet high-level military involvement in the chemical weapons activities in these areas, Soviet high-level officers who have been identified as belonging to the Soviet Chemical Weapons Corps who have been identified in Southeast Asia.

Senator **Quayle**. Did they fly the planes?

Mr. **Burt**. We have reports of certain flights that they are actually flying the planes.

Senator **Quayle**. Do the Soviets actually fly the planes on these missions that dispense the chemicals?

Mr. **Burt**. We have reports. We don't believe most aircraft are flown by the Soviets. We believe, as I said before, that they supervise these missions.

Senator **Quayle**. Now when we talk about supervision, that is what I want to establish, are we talking about supervising in Laos, in Kampuchea, or are you talking about command and control somewhere else?

Mr. **Burt**. No. We have evidence, as is outlined in the report, that they are in Southeast Asia.

Senator **Quayle**. People have seen them?

Mr. **Burt**. That is right.

Senator **Quayle**. Again, supervision, are they performing maintenance on the planes? Who has control of these planes? Do the Soviets have control of these planes?

Mr. **Burt**. In Laos, for instance, the Soviet Union controls the Laos Air Force.

Senator **Quayle**. Do they do anything special when these missions are about to be undertaken?

Mr. **Burt**. You know, Senator, we are talking about weapons which we believe only the Soviet Union has the capability to produce, to develop, and certainly only has the capability to ship to the countries in question, that has a tactical and strategic doctrine for delivering these weapons and we have evidence of a high-level involvement in the countries themselves.

Now there is a passage on page 13 of the report which talks about an incident, for example, in 1975 of a Soviet captain of a diving support craft engaged in salvaging a sunken ship in the Black Sea which had been transporting Soviet military supplies to Vietnam. He said his divers came in contact with toxic chemicals and a special Soviet salvage unit took over the operation after the divers became very ill. This is just simply one example of several instances in which there is Soviet involvement in chemical weapons operations in Vietnam.

Here is another example of two Vietnamese corporals from the 337th and 347th Vietnamese Army Divisions who stated that Soviet supplied chemical weapons were stored in caves near Lang Son in February 1979. Although their Vietnamese units were issued gas masks, they were told that Soviet-supplied chemical weapons would not be used unless the Chinese initiated chemical warfare.

Then, as late as 1981, a team of uniformed Soviet military advisers was attached to the corps headquarters. The team leader was a senior Soviet colonel. The Soviets were involved in training corps personnel in the use of Soviet-supplied weapons and equipment, including chemical artillery shells and gas masks. The Soviet team often inspected defensive positions and observed training maneuvers.

We see an extensive Soviet military role in the operations of the Vietnamese military, both in Laos and Kampuchea. There is obviously a Soviet military role in Afghanistan. Now it would be a little bit absurd I think to somehow assume that in the chemical weapons area that it was somehow different. Their military involvement in those three countries is beyond question in a training, in an advisory, in a command, and control and in a supervision role.

Senator QUAYLE. Can you give us a name of a Soviet chemical general that is in Southeast Asia? Do you have some names that we can put with this information?

Mr. CROCKER. We have the names of the team that went there in 1979. I don't have it with me.

Senator QUAYLE. You do have some names?

Mr. CROCKER. We have some names of Soviet chemical officers that visited in 1979.

Senator QUAYLE. Do we have names of Soviet chemical officers that are still there. That was 1979.

Mr. CROCKER. I am not sure at this point whether they have any there right now.

Senator QUAYLE. How about in the last 12 months or the last 2 years?

Mr. CROCKER. I believe we could provide names.

Senator QUAYLE. I think that would be helpful to start putting in some names instead of just talking about some Soviet supervision. If we can specify some names of Soviet chemical officers that were there, I think that would be very helpful.

[The names to be supplied for the record follow:]

We do not have names of Soviet chemical officers presently serving in Southeast Asia. In February 1979, a Soviet delegation of chemical warfare officers visited Laotian facilities where lethal chemical agents were stored. A senior chemical officer named Akutov headed the delegation which was escorted by the Soviet advisor to the Northern Laos Regional Command, Mikhaylov.

WHERE THE CHEMICAL AGENTS ARE BEING DEVELOPED

Senator QUAYLE. Where are these chemical agents being developed?

Mr. CROCKER. Well, if we are talking about the nerve agents, mustard, lewisite, and the other agents that we have identified that have been brought into Afghanistan, they have been developed in the Soviet Union. The toxins we believe are produced in the Soviet Union and that the material itself is shipped to Southeast Asia and perhaps weaponized there.

I would draw your attention to another story in the report where the port security officer, a Vietnamese who defected, described the shipment of wooden crates, how much they weighed, and described the canisters. They were broken open and the people that had broken them open were told it was a deadly toxic chemcial. This was then shipped on to a military installation.

I bring that up because we have a description from an Afghan defector who described a wooden crate that was brought into Kabul, and it sounds like the description is exactly the same.

As a matter of fact, I would say that the strength of this case, the strength of this report is the similarities on almost the exact same language, description of symptons, description of the chemicals, the doctrine, the tactics, everything is the same for these three countries.

How can you possibly imagine that the H'Mong have coordinated their stories with the Mujahidin?

Senator QUAYLE. you say that you believe they are produced in the Soviet Union. I presume that is less than a positive identification of where these agents are being manufactured. Maybe I could ask the question a different way. Where else could they be manufactured?

Mr. BURT. That is one of the major conclusions we have drawn, that we have not been able to find any facility in Southeast Asia that is of the size or has the other characteristics that would be capable of producing these weapons.

SOVIET UNION DENIAL

Senator QUAYLE. The Soviet Union has continued to deny any involvement in chemical warfare; is that true?

Mr. BURT. That is right.

Senator QUAYLE. You are convinced, others are convinced and I am convinced, of the fact that they are linked, that they are involved in this. Why do you think that they do this? Is this just part of their propaganda?

Mr. BURT. I would say if it is propaganda, it is not very effective.

Senator QUAYLE. I mean, put yourself in their position. Why are they just absolutely denying that this is going on? What is their motivation? What do they expect to get out of it? Why do they tell us that they simply aren't doing it?

Mr. BURT. Well, Senator, you are asking two different questions. I would imagine they are denying it because they don't want to confirm that they are doing it for obvious political reasons. As for why they are conducting these operations, I think there are a variety or reasons.

One is that they are using these weapons in highly inaccessible areas, areas in which the use of conventional ordnance is not effective, in very rugged terrains where people are dug in against very committed insurgents, such as the Freedom Fighters in Afghanistan or the H'Mong tribesmen in Laos, where the use of their own conventional forces, ground forces is highly difficult, highly dangerous and is not likely to be successful in sweeping forces through a very rugged area and then having to leave.

Where these weapons are particularly effective is against people who are agrarian, who have to live off the land, who are backward in many respects where these kinds of weapons would be particularly effective in getting them to move, to leave where they are dug in, and where there is also a relatively small chance of discovery.

I will remind you that it took us over 3 years to discover and actually identify one of the toxins that was actually being used against these people.

I think that there is also the real possibility that the Soviet Union is using these weapons in remote areas as a testing ground, as a proving ground for weapons that they have had under development for many years and where the military thinks that it can learn something about their use under actual operational circumstances.

Senator QUAYLE. I see my time has expired.

EFFECTIVENESS OF CHEMICAL WEAPONS

Senator WARNER. If the Senator will yield, as a followup to his last question and good question, how effective have these chemical weapons been?

Mr. BURT. Well, we think they have been very effective. They have not only killed many thousands of people, but they have driven people off the land. They have taken people who are probably some of the toughest most difficult people, you know, to fight, tribesmen in Laos, freedom fighters in Afghanistan, and they have destroyed their cultures.

They have not only killed people, but they have destroyed their livestock and they have made their environment unlivable. So, from that standpoint, they are probably very effective weapons, as inhumane as they are.

Senator QUAYLE. Well, it seems to me that by just totally denying this situation they are showing utter contempt for the world. I expect that they believe that reasonable people around the world are going to believe this. I just urge you and others to continue to speak out on these atrocities. They are killing people.

Unfortunately, maybe we haven't in the past paid enough attention since it happens in some Third World countries as it is right now.

I notice my time is up.

I just have one final question, if I could, Mr. Chairman.

Senator WARNER. Sure.

Senator QUAYLE. Do you believe that they really are just going to use this in Third World countries and that they have no plans to use it, say, in a confrontation against the United States?

Mr. BURT. Well, I would only say again that one can't say very much about intentions, but judging by capabilities, we have to assume, given the fact that they talk openly about these capabilities in their military manuals and they have demonstrated a capability and a willingness to use these weapons. In a general war situation, say a war between NATO and the Warsaw Pact, we would assume because their doctrine talks about using chemical weapons, in addition to conventional and nuclear weapons, that these weapons would indeed be used.

Senator QUAYLE. Can I ask one final question and then I will cease.

Senator WARNER. Yes, indeed.

Senator QUAYLE. Thank you. You are very considerate and I appreciate your indulgence.

This morning in the Washington Post it was indicated that perhaps mycotoxins do not cause hemorrhaging of the kind which has killed thousands. Is that correct?

Mr. BURT. Senator, I would like Sharon Watson who works for the Surgeon General of the Army to answer that question.

TRICHOTHECENES

Dr. WATSON. Senator, that is incorrect. The trichothecenes have been shown in recent studies that have been conducted at the U.S. Army Medical Research Institute of Infectious Disease in Frederick, Md., to implement blood clotting factors. The blood clotting factors are impaired very early in the intoxication with T-2 toxin, and the animals have died exhibiting symptoms very similar to those that have been described by the victims in Southeast Asia.

Another point that was made in that article was that these are not the most toxic compounds and that these compounds would not be very effective to use as agents so why wouldn't you use something that is more toxic?

In answer to that I would say that we have to look at the relative toxicity of the compounds. It is true that they are not as toxic as some of the nerve agents, but they are in themselves quite toxic.

On the basis of animal data, the LD-50 for a 70-kilogram man can be estimated to be 35 milligrams. This vial contains 35 milligrams of an inert substance. As you can see, that is not even enough to cover the bottom of the vial. This is a dose that would be lethal to 50 percent of the people who were exposed to total absorption of this dose. So that you can see that the trichothecenes are quite toxic.

In addition, several other factors need to be considered when we look at the toxicity data on the compounds. The people who have brought up these points are looking at literature reports in which the toxins were administered singly usually by oral administration.

Any toxicologist will tell you that the route of administration has a great deal to do with the manifestation of the toxicity. Typically when compounds are adminstered by inhalation the time of onset of the symptoms and the severity of the symptoms are much more pronounced than by oral ingestion.

Another factor is the solvent that is involved. In additional studies that have been conducted at USAMRIID it has been shown that the toxicity of these compounds can be potentiated as much as 20 times, depending on the solvent that they are administered in and that the time of the onset of the symptoms is greatly accelerated when they are administered in a solvent such as DMSO.

Other factors that have to be considered are that these are combinations of toxins and not a single toxin. Since their mechanism of action is sometimes somewhat different you can get more than an additive effect. You can get a synergistic effect with the toxins when they are administered in combination.

Then, also, we believe that the weapon that is being used is a crude extract. Laboratory studies indicate that the crude extract is more toxic than the purified compounds by themselves. In other words, there is another component in the crude extracts that potentiates the toxicity of the trichothecenes.

So I think there is no question that the trichothecenes can and do cause the symptoms that you are seeing in Southeast Asia.

Senator QUAYLE. Thank you.

Thank you very much, Mr. Chairman.

Senator WARNER. Your report indicates that many of the symptoms experienced in Afghanistan are those associated with trichothecenes, yet the report seems to refrain from the conclusion that such toxin weapons are being employed there. We only received this report at noon today, but that is a quick analysis.

Mr. BURT. Well, Mr. Chairman, in an effort to be as careful as we possibly could, we think it is prudent at this point to say that we have concluded that these toxin weapons are in use in Southeast Asia. At present we are not willing to say with complete assurance that these toxin weapons are being used in Afghanistan. Chemical weapons and the broader family of weapons, we believe, are being used in Afghanistan. As for the evidence so far on the use of toxin weapons in Afghanistan, it is still not as firm as it is in Southeast Asia. We are continuing to collect evidence and we are watching that situation very carefully.

In fact, one of the real differences is that we have looked a little more closely at the Southeast Asian situation than we have the Afghanistan situation. It is more recently really that we have begun looking for the toxin evidence in Afghanistan. Of course, if there is more evidence, as Senator Quayle in one of his earlier questions I think indicated, when and if there is more evidence we will make it available.

It is our desire to offer and make public as much evidence as we possibly can and to share it with all interested governments.

Senator WARNER. Do you believe that the evidence supplied today in this report is sufficiently complete also to substantiate claims by the administration with regard to precise numbers of casualties?

Mr. BURT. Well, here on the question of casualty numbers I want to make something clear. These are casualty numbers that we feel we have successfully verified in the checking and doublechecking procedure that I discussed in my testimony. In fact, we think casualties in all three countries, Laos, Kampuchea, and Afghanistan are in fact higher, but in an effort to be as careful as possible to check and double check and reconfirm reports, these are the casualty numbers that we feel confident about.

Senator **WARNER**. Could Dr. Watson provide a description of the physiological symptoms which the category of weapons that we are discussing today and employed in Southeast and Southwest Asia produce?

Dr. **WATSON**. Yes, Senator. The trichothecenes induce a violent itching within minutes of administration which is followed by vomiting within 10 to 15 minutes. The vomitus becomes tinged with blood within 30 to 60 minutes at a high dose and the toxins attack the mucous membranes. They attack all rapidly dividing tissue and the mucous membrane is one of the primary targets. Hemorrhaging from the mucous membranes is a frequent occurrence with the trichothecenes.

Long-term toxicity is very similar to radiation poisoning in that these compounds are radiomimmetic. So that many of the symptoms that are seen in radiation poisoning are also seen in poisoning with the trichothecenes. There will be a recovery period in which the individual is beginning to feel better and has no overt symptoms and then a final phase of the disease culminating in death.

I think these symptoms are outlined in the report in a little bit more detail, each of the phases of the disease, in that final section on the literature review of the trichothecenes.

Senator **WARNER**. Secretary Burt, this panel has presented its evidence to the European allies. What has been their reaction to the evidence?

Mr. **BURT**. Well, I think they are growing much more concerned about this problem. After Secretary of State Haig first raised this issue publicly, raised the fact that we had identified the toxin weapon in use, we dispatched a team of experts to Europe and they consulted with the NATO allies.

I can say that all the governments are interested in this problem, they are concerned about this problem and they are beginning to help us in varying ways with this problem. As I mentioned in my testimony, we now have samples that are being examined by some of our allies. We are getting the support of some of the countries who are collecting their own samples who have people available and they are cooperating with the U.N. panel. Later this week, another team of U.S. experts is leaving for Brussels and other NATO capitals to consult with them.

As I think I mentioned at the end of my statement, we believe that this is not simply a U.S. responsibility. This is an international problem. We think that the more our allies and other countries know about the problem the better, and I would expect them to be more active on this front as they become more experienced with this problem, know more about the problem, and have more facts at their disposal.

Senator **WARNER**. Has there been any effort on their part to sit side by side with the medical analyses of these materials and let their own doctors make an analysis?

Mr. **BURT**. That is underway at present.

Senator **WARNER**. Senator Nunn, we are pleased to have you join us. Do you have questions?

Senator **NUNN**. Thank you, Mr. Chairman. Go right ahead and I will try to catch up.

U.S. CHEMICAL ALARM SYSTEM

Senator WARNER. Let's talk about the preparedness of the United States. Is it not the case that U.S. chemical alarm systems would be incapable of detecting and thereby warning of the presence of this classification of toxins?

Mr. BURT. I am not an expert on our capabilities in this area, Senator, but I think we do have a Defense Department official here who might be able to answer that question.

Senator WARNER. Ms. Hoeber, we welcome you. You are well known to the committee, but if you will please provide your name, it will assist the reporter.

Ms. HOEBER. I am Amoretta Hoeber. I am the Principal Deputy Assistant Secretary of the Army for Research Development and Acquisition.

Senator WARNER. I might also add that you have written a very informative treatise on this subject which I have studied very carefully.

Ms. HOEBER. Thank you, sir.

Our chemical defensive devices today were not designed to protect against the mycotoxins. We believe that many of the defense devices such as gloves and suits and masks will protect. However, our alarms were not designed to and today do not detect these agents.

Senator WARNER. Thank you. Could you remain at the table in case there are other questions?

THE GENEVA PROTOCOL

Some critics have gone so far as to claim that the Geneva protocol banning first use of chemical weapons pertains only to signatories and that use against nonsignatories would not represent a legal violation of this treaty.

Would you care to comment?

Mr. BURT. I am going to turn to Mike Matheson who works for the legal adviser at the State Department to comment on that.

Mr. MATHESON. Senator, that is technically correct. The Geneva protocol itself applies only as between parties to it. However, the international community has long ago come to the conclusion that the prohibition which is stated in the Geneva protocol has become a part of customary international law which applies to all states whether or not they are parties to the protocol.

I would add that among the strongest proponents of that view is the Soviet Union and its allies. So that there is no question but that the prohibition against the use of chemical and biological weapons in the protocol applies to all states regardless of whether they happen to have adhered to that protocol.

Senator WARNER. The analyses performed by the laboratories on these materials, has the press been allowed the opportunity to watch the analyses.

SAMPLE ANALYSIS

Dr. WATSON. I am sure that Dr. Mirocha would have no objections to the press watching an analysis of the sample. He has been very open and free with his laboratory and in talking to the press and his technique is well known. The individual, Dr. Mirocha, is very well known in the community and very much respected.

The samples that we are receiving now we have started to analyze by another technique as a verification measure. So that we are using not only the gas chromatography/mass spectroscopy technique of Dr. Mirocha's, but we are also now examining samples with the radioimmune assay technique which is also very sensitive for the trichothecenes. This is being performed at another independent laboratory so that we will have two independent analyses of the same sample.

Senator WARNER. Is there thus far any disagreement within your prefessional community, as to the findings?

Dr. WATSON. I am sorry, sir, could you repeat that?

Senator WARNER. Thus far within your professional community, has there been any disagreement in the findings?

Dr. WATSON. I have consulted with a number of trichothecene experts, all of which agree with our interpretation of the data.

Senator WARNER. Senator Nunn.

Senator NUNN. Secretary Burt, I have caught up with your statement and read it and I think it is an excellent statement and I congratulate you on it.

You may have already answered this question, but of course the logical question that most people in my State ask and I am sure this is true around the country is if the Soviet Union is breaching flagrantly an agreement that they have already entered into how can we then negotiate new agreements with them?

Mr. BURT. Senator Nunn, our answer to that is that, first of all, we have got to make sure that we never again enter into arms control agreements that do not have effective verification and compliance provisions as these did not.

I think the crime, and that is what it is, an international crime, is so heinous that I would imagine that those who signed the 1972 Convention on Biological and Toxin Weapons probably concluded it didn't need a verification mechanism because no one was going to violate it. I think unfortunately we have learned otherwise.

Senator NUNN. Isn't it true that even Hitler in World War II refrained from using these chemical weapons?

Mr. BURT. That is right, nerve gases and others that were in the German stockpile were not used by the Germans during the war.

But to get to your question, I think this has just demonstrated the critical importance of verification if arms control is to succeed. We have got to insure not only in the chemical weapons area, but in arms control across the board, that we are able to verify agreements and that agreements cannot be based on trust and good faith alone.

Senator NUNN. Well, isn't this today in a sense a verification by the United States that an agreement is being breached?

Mr. BURT. I think that is a fairly accurate description of the problem; yes.

Senator NUNN. Now we have got an agreement we entered into that has been breached and we have got a verification which you say almost every agency in our Government that has got jurisdiction agrees with.

Mr. BURT. Every agency.

Senator NUNN. Every agency. Then where do we go from here?

Mr. BURT. Well, I think there is the narrow answer and the broad answer. The narrow answer of what do we do about this problem is that we begin to think very seriously about improving existing arms control constraints, and we are doing that. We are looking at the possibility of trying to improve the 1972 convention outlawing biological and toxin weapons and we are also taking a very rigorous approach to the whole question of negotiating any chemical weapons agreement, specifically that verification has to be a No. 1 priority.

The broad answer is that in the international political realm we have got to make this a more important question. We have to make sure, in our dialog with the Soviet Union, that they take this problem seriously and that it affects other facets of the relationship. In discussions with our allies, we have to make sure that they understand the importance of this problem; and that the Third World countries understand that they are the ones that are likely to suffer first. We are sensitizing them to this problem. We are, as I said before, visiting not only allies but other countries in the near future to talk to them about this problem.

SPECIAL SESSION ON DISARMAMENT

We will raise this issue at the United Nations, not only in the context of the investigation that is underway now, but at the General Assembly. I would imagine that this issue will also come up in the Special Session on Disarmament this June. It is a question that has to be high on the international agenda because we think that the best way, the quickest way to bring this activity to a halt is quite simply to embarrass the Soviet Union.

Senator NUNN. Are our allies cooperating at this time?

Mr. BURT. Yes; they are.

Senator NUNN. Which ones deserve the blue ribbon in terms of cooperation if we can do that?

Mr. BURT. Well, I don't want to single any one out, but I think it would be fair to say that we have had the closest dialog so far on this issue with Britain.

Senator NUNN. How about Japan, are they cooperating?

Mr. BURT. They are interested in this issue and they are cooperating.

Senator NUNN. Do you know whether the Soviet doctrine allows the use of chemical weapons without approval from the high-level civilian Politburo? Do you know what that doctrine is?

Mr. BURT. I can't answer that question specifically, but based on the experience that we have seen and based on what we have read in their military manuals, they do appear to have a fairly cavalier attitude toward the use of these weapons.

Senator NUNN. You mean the military may have authority to use these weapons without clearing it with the high-civilian leadership?

HOW THE CHEMICALS WERE TRANSPORTED

Mr. BURT. That is just impossible to say, Senator.

Senator NUNN. When these weapons are used in Southeast Asia does our intelligence community, and if any of this is classified just defer and we will ask it later in a closed session, but does our intelligence community know how the chemicals are transported to get them there? Obviously we think they are coming from the Soviet Union; is that right?

Mr. BURT. Let me ask Gary Crocker to respond to that.

Mr. CROCKER. There is a description in the report, Senator, of the offloading of a ship in Ho Chi Minh City. This was reported to us by a Vietnamese who defected who was the port security officer who described the wooden crates being unloaded and the canisters that were in the crates full of deadly toxic poison that were loaded on trucks and shipped to the Long Binh storage area. The crates sound very much like what we heard described brought into Kabul, the same kind of crate, size and weight.

The canisters, if you look at H'Mong testimony from Afghanistan you will hear about this canister that is about 18 inches long or a meter and 2 to 3 centimeters in diameter. You will hear this from many reports.

We also have reports that the Soviets in Vientiane assist in weaponizing, taking the chemicals and putting them in weapons.

Our conclusion is that the toxin itself is made in the Soviet Union and shipped in bulk to Southeast Asia.

Senator NUNN. Is that by merchant ship?

Mr. CROCKER. The information we have, we have two reports that appear in the document that lead us to believe that is it shipped by merchant ship.

Senator NUNN. All right. Now where would that merchant ship originate in your opinion?

Mr. CROCKER. Well, the report we have here says it originates in the Black Sea in the Port of Odessa.

Senator NUNN. What calls would that ship make on its travels from there to Ho Chi Minh City?

Mr. CROCKER. Well, unfortunately, the ship we are talking about sank in the Black Sea and they spent several years recovering the chemical from the ship.

Senator NUNN. I thought you were relating where the ship was actually unloaded in Vietnam.

Mr. CROCKER. It was unloaded in Ho Chi Minh City.

Senator NUNN. You mean it was sunk on the way back?

Mr. CROCKER. No. There are two reports. One is about the ship that was sunk in the Black Sea on its way to Vietnam. The second report is of last year, July 1981, when the ship arrived in Ho Chi Minh City and unloaded the crates of toxic chemical substance.

Senator NUNN. That second one we are talking about, the one that didn't sink that actually unloaded, where would that ship in a normal course of a merchant ship, would there be port calls on the way?

Mr. CROCKER. I would imagine so. I don't have the answer to that question.

Senator NUNN. It seems to me it would be useful to point out to the country where that ship may have stopped if they had a load of toxic weapons.

Mr. CROCKER. I understand your point. The same is true if they are flying it. If you are flying these toxic chemicals to various clients that seems a danger in itself.

Senator NUNN. Do you think there may be information that is available that is just not in the report at this stage?

Mr. CROCKER. I could check that out.

Senator NUNN. Could you check, and if you have it in this particular case we would like to have it for the record, with the permission of the chairman. But if it is not available in this particular case, could you give us the normal support stops, the countries, the length of time and so forth of ships, normally merchant ships that would normally travel from the Soviet Union to Vietnam?

Mr. CROCKER. We will check that out, Senator.

[The information follows:]

We could not identify the Soviet merchant ship that delivered the toxic chemicals to Vietnam in July 1981 on the basis of the information provided by the source, a Vietnamese port security officer. Normally, Soviet merchant ships that carry military cargo to Vietnam do not make stops. However, in reference to your point that the shipment of lethal agents by sea could pose a danger to countries along the route, Soviet merchant ships would pass through the Turkish Straits, the Aegean Sea, the Suez Canal, and the Strait of Malacca. In each of these sea areas, an accidental spill of toxic chemical warfare agents would pose a significant danger to the adjacent countries. It takes anywhere from two to three weeks for a merchant ship to transit from the Black Sea port of the U.S.S.R. to Vietnam.

Senator NUNN. Now as I understand it, you are saying that there were other toxic chemical weapons that you believe went down with the ship in the Black Sea?

Mr. CROCKER. Yes, in 1975.

Senator NUNN. Do we have any expert information on what the consequences of those chemical weapons being in the Black Sea would be for the littoral countries and also for the sea itself?

Mr. CROCKER. They actually raised the ship and towed it back to port and took the chemicals off in port.

Senator NUNN. So the chemicals actually were brought back?

Mr. CROCKER. We are talking about the salvage operation took 2 to 3 years.

Senator NUNN. My time is up.

Thank you, Mr. Chairman.

Senator WARNER. While we are waiting for Senator Nunn to complete his questioning, the chairman is going to place into the record the statement by Max M. Kampelman, Chairman of CSCE, which I find to be extremely informative on this subject.

[The statement by Max M. Kampelman follows:]

PREPARED STATEMENT BY MAX M. KAMPELMAN, CHAIRMAN, U.S. DELEGATION CSCE

Mr. Chairman. The procedural chaos on Tuesday made the exercise of this right of reply inappropriate: our long list of speakers on Friday made it undesirable. I will address myself now to a narrow portion of the Delegate's strange criticism of my country. Since this is an informal meeting of the heads of delegation, I will do so with some specificity, comfortable in the knowledge that it will not serve to divert our attention from the violence that has been perpetrated against the people of Poland in violation of the Helsinki Final Act.

All of mankind lives with the horrible reality that the unravelling mysteries of science and technology have so intensified Man's capacity to be brutal to Man that he runs the risk of destroying himself and his planet. This conference in Madrid is another in a long series of searching steps to seek means of minimizing the threat of war and violence for us and our children. This is why so many of us here have expressed our deep concerns about the tragic developments in Poland.

Reason and conscience demand that we continue to work for agreements and treaties among ourselves to increase the degree of sanity governing relations among states. Principle X of the Helsinki Final Act is based on the premise that if there is to be any confidence in our capacity to begin weaving the fabric of understanding among us so essential to our survival, those international treaties must be looked upon as sacred ones, to be scrupulously observed. When they are not observed, we must, as we did all of last week on Poland, and as we will continue to do, express our outrage and disappointment.

As early as 1925, with the expansion of new frontiers of knowledge, statesmen with vision understood the need to deal with the awful realization that Man then had the capacity to unleash poisons in the air. In that year, the Geneva Protocol was signed banning the use of chemical and bacteriological gases.

Science continued to evolve and prove the maximum that the devil too evolves. The more powerful nations, including our own, found themselves in a race to adapt new learning to wartime use. The growing sophistication of bacteriology and chemistry now provided additional instruments of horrible destruction.

The United States, in an effort to inject sanity into the process, unilaterally renounced its use of those weapons in 1969. A sensible solution then emerged: let us agree mutually to renounce the use of biological or toxic weapons. An international convention toward that end was signed in 1972 by 111 countries. The pledge taken was not to "develop, produce, stockpile or otherwise acquire and retain" these biological weapons.

Most of the world greeted that step with enthusiasm. This was not an arms limitation; it was a disarmament agreement. We knew that the treaty did not provide for ways to insure verifiability, but we were convinced that the treaty would be observed because the alternative was too awful to be contemplated by the rational mind. This proved to be a naive error.

It is with regret, Mr. Chairman, that I bring to the attention of this meeting that the Geneva Convention of 1925 and the 1972 Biological Weapons Convention have both been seriously and deliberately violated by the Soviet Union. The consequences are most serious. The realization that even in this area the Soviet Union operates without restraint affects our confidence in any agreement signed by the Soviet Union. The need for absolute and unmistakable verification of any agreement to be entered into is now for us unconditional.

But the violation of Principle X of the Helsinki Final Act represented by these transgressions, serious as it is, is not our only deep concern arising from this disregard for international law and human decency. There is an intense moral and practical concern as well.

It is unmistakable that innocent people in Laos, Kampuchea, and Afghanistan have been victims of a deadly poison rained down upon them by airplanes carrying, among other lethal agents, potent mycotoxins of the trichothecene group. Death, often with victims choking on their own blood, occurs within an hour after exposure. This biological warfare agent has either been used by Soviet planes and Soviet pilots, or supplied by the Soviet Union to the pilots and planes of others.

Soviet scientists have been working on biological weapons since the 1930's. Judging by its published scientific articles, the emphasis of their work has been on how to produce the poison in massive quantities, rather than on how to create antidotes, or on how to prevent bacteriological attacks. Furthermore, we have sound reason to believe that during 1963–67 the Soviet Union tested its poison gases and bacteriological toxins in combat during Egypt's war with Yemen.

In April 1979, an explosion occurred at Soviet Military Compound No. 19 in Sverdlovsk in the Ural Mountains. That explosion released a cloud of anthrax spores into the atmosphere. The Compound was then and is today the site of a Soviet biological weapons research and production facility. It is reported that more than 1,000 people died in that explosion. The amount of spores released into the air was much too large to be a research sample. It indicated that the Soviets were mass-producing the bacillus. We are aware of five other such facilities in operation today.

Refugee victims from the areas of biological poisoning tell tales of either "yellow rain" or "blue rain" or "black rain." The amounts of poison found on the scene and recovered demonstrate that they were manufactured and not produced by nature. The only known factories in the world that manufacture these poisons are in the Soviet Union. Their use, in defiance and violation of international agreements, merits the condemnation of civilization.

Now let me move to the related question of chemical warfare, raised by the Soviet Delegate.

The record will show that in 1969 the United States ceased the production of all chemical weapons and has today only one chemical weapon production facility, which is no longer usable or used.

The record will also show that today the Soviet Union operates at least fourteen chemical weapon production facilities. Its armies are better equipped, better organized and better trained in chemical warfare than any others in the world. Each Soviet combat unit, down to the regimental level, has a sizeable chemical warfare contingent. Chemical warfare specialists are assigned at the company level. It is estimated that there are close to 100,000 personnel with chemical warfare training, a training which uses actual chemical agents. Soviet artillery units are regularly equipped with various kinds of chemical warfare shells and other weapons. The Soviet Union has without doubt invested heavily in all aspects of chemical warfare.

My government, therefore, found itself in a position of having to unilaterally renounced production of all chemcial weapons in 1969 while the Soviet Union recklessly proceeded forward in an effort to gain world supremacy in this area of warfare.

I have been informed by experts that the question of verification is a complex and difficult one. We concluded that on-site inspection was a prerequisite for agreement. We found that the Soviet Union rejected all suggestions for on-site inspection. It appeared to us that the Soviets had no incentive to enter into an agreement with us. They possessed a decisive advantage in this field because of our inactivity and saw no reason to give it up. Nevertheless, they continued to talk, without decision; and we saw that their purpose in going through the form of the negotiation was to impede the ability of the United States to protect its own interests by building an adequate deterrent capability. We concluded that it was essential to demonstrate to the Soviet Union that we would now deny them any significant military advantage from using chemical weapons. We would improve our defenses against their use and thereby prayerfully reduce casualties; but it was also necessary for us to maintain a capability to retaliate so as to reduce any incentive that the Soviets might have for the first use of these awful weapons.

It is thus the reluctant policy of the United States to build and maintain a chemical munitions stockpile to deny a significant military advantage to any who would seek to initiate their use. We are making only those improvements necessary to provide us with a credible and effective deterrent.

It is our fervent hope that this program will provide an incentive to the Soviet Union to join us in seeking a complete and verifiable ban on the production, development and stockpiling of all such weapons.

Our objective is not to produce chemical weapons. We have demonstrated the genuineness of that objective by our unilateral action of 1969. Our objective is to achieve a complete and verifiable prohibition of chemical warfare. Our unilateral restraint has not worked and has instead only resulted in a significant imbalance between our capability and that of the Soviets. It is necessary for us to try another approach. We are doing so.

The official position of our government was stated in the following announcement from the White House:

"The Administration's ultimate goal in the area of chemical warfare (CW) is a complete and verifiable ban on the production and stockpiling of chemical weapons. Until such a ban can be obtained, our objective, consistent with existing treaties and international law, is to deter the use of chemical weapons. The U.S. will not use chemical weapons unless chemical weapons are first used against us or our allies. The U.S. does not and will not possess biological or toxic weapons."

We have had enough self-serving and misleading allegations and assertions by the Soviet Union here and elsewhere. The search for peace will not be achieved by propaganda. The search for peace will be achieved by actions consistent with peace. That is what our delegation has been asking for at this meeting. When we see action which merits a constructive response from us, I want to assure this body that our response will be immediately and generously and enthusiastically forthcoming. Until then we will expose the propaganda for what it is, just as we will continue to use this forum to expose the violations of the Helsinki Final Act, including the violence against the people of Poland, for what they are.

Thank you, Mr. Chairman.

THE U.S. ANALYSIS

Senator WARNER. You may continue Senator Nunn.

Senator **Nunn**. Mr. Burt, in this morning's Washington Post, and I don't know whether you read this paper or not, it is a local paper here, has been talking considerably about this case and making some points that you may or may not consider to be valid, but if you did read the editorial this morning the Post says in all seriousness that a convincing case has simply not been made.

The final paragraph is the Government in short has not been careful enough. This has had the effect of helping to divert attention from what the Soviet Union may be doing to what the American Government is saying. The quality of the evidence that has been accumulated so far, its analysis and interpretation, does not fit with what Americans and other nations expect from the most technologically sophisticated country in the world. Would you comment on that and give us your views.

Mr. **Burt**. Well, I will make a brief comment and then I would like Gary Crocker and Sharon Watson to comment on it. Both were involved in the drafting of the report and have been intimately involved in this process day by day.

I guess I would like to begin by just simply saying that when I see stories like that I am obviously discouraged, because this is not simply a fly-by-night or off-the-cuff issue for us. This is an issue that has been not simply the concern of the Reagan administration, but it has been an issue of concern for two successive administrations. It was first brought up by the Carter administration and there have been several people in different agencies who have worked very hard and very long, first of all, to convince themselves and, second of all, to convince the policymakers that there was a problem.

We have known for some time that there has been a problem. You just can't ignore the hundreds of stories from refugees, from international welfare workers, from Government officials, and not just American Government officials, that flowed out of Southeast Asia since the midseventies. It was really a turning point, but not necessarily the decisive development, when we were able to identify the toxin last fall. There was clearly something wrong, and a number of governments and a number of people knew something was wrong.

It was this concern about the issue that led Secretary of State Haig to say something about this question last fall in a speech in Berlin. Since then several agencies, the State Department, the intelligence community, the Defense Department, the National Security Council, the Arms Control and Disarmament Agency, have undertaken an exhaustive study of the evidence. A lot of reports and a lot of information which couldn't be confirmed and couldn't be verified was not included in this report.

As I said in my opening statement, rarely have I seen, and in fact I haven't seen since I have been in Government, an example of where every agency has unequivocably agreed and concluded that, in fact, this heinous activity was underway and that the Soviet Union was involved with that activity. We have been very careful. We have been prudent. We have made every single bit of information, with the exception of some sources and methods issues which are too sensitive, available to the press.

On the two specific points that the Post raised, Sharon Watson dealt with a little bit earlier. We think the Post is wrong. We can match up the symptomology of the toxins with what we have seen in the refugee reports, and we deal with that in the report and, second, we have found that the toxins do produce this bleeding, this hemorrhaging which is associated with the toxin poisoning.

So, we believe that we have a strong case, we believe we have shared the evidence and we believe that we have taken, I think, the most prudent, exhaustive effort in this area that is possible. I am going to let Gary Crocker and Sharon Watson say something.

Mr. CROCKER. Let me say that if you look at this as that we have to prove that murder is committed, who committed the murders, what the murder weapon was and provide a motive. That is basically the way the U.S. Government has looked at this and set out its analysis.

There is a cry all the time for physical evidence. I would maintain that the good evidence is the human testimony. I think that the strength of this report that we have provided is that we have supported the testimony of the H'Mong, the refugees from Cambodia, the DK and the Mujahidin from Afghanistan.

We do things like if they say it was a certain aircraft we check to see whether that type of aircraft was in the area at that time. We check the weather. If they said a plane came over and sprayed we look at the weather. Is that possible. We look at the climatic conditions.

We have checked every detail of these people's reports and that evidence is provided here in order to prove that they in fact experienced this terrible, almost bizarre set of circumstances when they were hit with a chemical agent. That is the strength of it.

Now I think Sharon may want to say more about what we have done in terms of checking our results and getting control samples and the rest of it.

Dr. WATSON. Well, before I do that I would like to address the two questions that were brought up in that article in the Post.

There was some concern that has been expressed by interested scientists regarding the question of whether or not the trichothecenes can produce the rapid hemorrhage from the mucous membranes that has been reported to occur in Southeast Asia. The concerns have been raised by individuals reading the scientific literature which typically deals with reports in which the toxins were administered by oral ingestion.

T-2 TOXIN

Recent experimental studies that were conducted at the U.S. Army Medical Research Institute of Infectious Disease in Maryland have shown that very early in the course of intoxication with T-2 toxin there is a severe impairment of the blood clotting mechanism and that the animals did die within hours of T-2 exposure and exhibited symptoms correlating very closely with those that have been seen in Southeast Asia.

These same studies have also shown the T-2 toxin is rapidly absorbed through the skin and that its absorption and its toxicity can be enhanced and accelerated 10 to 20 times depending on the solvent system in which it is administered.

Another question that has been considered is whether or not it is possible to effectively disseminate lethal quantities of these toxins. It has been claimed by some that large amounts of the toxins would have to be absorbed to produce the lethal effects that are observed.

The LD-50 for a 70 kilogram man for T-2 toxin can be estimated on the basis of animal data to be 35 milligrams. An LD-50 dose is a dose that is lethal to 50 percent of an exposed population.

I have brought along with me 35 milligrams of an inert substance. As you can see, that is not even enough to cover the bottom of this small vial. So that I think that everything here is relative in that although these are not the most toxic compounds that could be used, they are still quite toxic and can be effectively used in this way.

Other factors that need to be considered are the route of administration. When any toxic substance is administered by inhalation the onset of symptoms and the severity of the symptoms are usually much greater than by other routes such as subcutaneously or by oral administration. The solvent is important.

It is also important that these toxins are present in combination rather than a single pure toxin. It is important that we feel that they are using the crude extract. Laboratories studies have shown that the crude extract from the culture is more toxic than the purified compound and that there is something else besides the trichothecenes which we have identified in the crude extract which potentiates the toxicity of the trichothecenes.

So all of these factors have to be taken into consideration when considering the question of whether or not these toxins are indeed toxic enough or can be effectively used in this manner, and I think there is no question that they can and that the experimental data supports that in carefully controlled studies using the pure compounds.

In regard to our controls, there was some criticism earlier concerning whether or not this could be a natural occurrence. We have gone back into the areas and done extensive sampling of control vegetation and soil and water and even sampled rice and corn because these are substrates on which the fusarium species typically grows. In none of these samples have we been able to detect any of the trichthecenes that we have found in the chemical warfare samples from those areas.

The most recent evidence that we had on the last three samples that were analyzed came from substrates that would be highly unlikely to support fusarium growth, the surface of rocks (two of the samples came from the surface of rocks), and one was a water sample. Fusarium does not compete very well in the environment and certainly could not grow and produce toxins in such an environment (that is, on the surface of a rock or in the water).

So that we feel very strongly that we have made a strong physical case that there can no longer be any doubt that the trichothecenes were used as agents in Southeast Asia.

Senator NUNN. Just a couple more questions, Mr. Chairman.

As I understand it, you are convinced that toxins and chemicals have been used both in Afghanistan and in Southeast Asia.

Mr. BURT. Senator, we do not have a definitive conclusion concerning Afghanistan. We believe that chemical weapons have and are being used in Afghanistan. We do not have definite evidence as of yet on the use of the toxin weapons in Afghanistan.

Senator NUNN. All right. In terms of chemicals you believe chemicals have been used in both Afghanistan and in Southeast Asia?

Mr. BURT. That is right.

Senator NUNN. In which of those areas are you more confident that you have proved your case?

Mr. BURT. I think we are confident of both. I think on the use of chemical weapons as opposed to toxin weapons we have more evidence that a wider array of chemical weapons are being used by Soviet forces in Afghanistan.

Senator NUNN. You are a scientist, is that right?

Dr. WATSON. Yes, sir.

Senator NUNN. What is your degree?

Dr. WATSON. I am a Ph. D. toxicologist.

Senator NUNN. I don't know how you measure a scientific certainty, but if you just took a scale of 1 to 10 what is your degree of confidence that you have established scientifically and analytically that the Soviet Union and its allies have used toxins in Southeast Asia?

Dr. WATSON. Ten.

Senator NUNN. The same question as to chemicals in Southeast Asia.

Dr. WATSON. Seven.

Senator NUNN. The same question as to chemicals in Afghanistan.

Dr. WATSON. Nine.

Senator NUNN. Nine?

Dr. WATSON. Yes, sir.

Senator NUNN. Thank you, Mr. Chairman.

Senator WARNER. Now I judge your response, where it is less than 10, relates only to the chemistry and not the other linkage?

Dr. WATSON. Yes, sir. We don't have physical samples that show the presence of the agents in Afghanistan. In order for me to say 10 as a scientist I would have to have a physical sample in which I found the chemical agent.

Senator WARNER. What do you base the seven on?

Dr. WATSON. The validity of the reports and the close match up in the symptoms with other chemical agents, I think there is no doubt that things like riot control and phosgene oxime have been used in all three countries. There are some reports in all three countries in which the symptomology matches up more closely with those compounds than with the trichothecenes. The trichothecenes are not the only agents being used, certainly not.

Senator WARNER. Senator Nunn, unless there are other questions, that completes the testimony of this panel.

We thank you, Mr. Secretary, for appearing today and we thank the participation by each of your colleagues, and Secretary Hoeber from the Department of Defense.

We have heard a lot about nuclear war and it certainly is a terrifying possibility, nuclear war, but chemical warfare is a terrifying reality based on what we have learned here today.

Mr. **BURT**. Thank you, Mr. Chairman.

Senator **WARNER**. We will take a short recess so that the next panel can be properly seated.

[Whereupon, at 3:30 p.m., the subcommittee took a short recess.]

SOVIET CHEMCIAL WARFARE—Continued

The subcommittee reconvened at 3:35 p.m. in room 1202, Dirksen Senate Office Building, Senator John Warner (chairman) presiding.

Present: Senators Warner and Nunn.

Staff present: Frank J. Gaffney, professional staff member; Paul C. Besozzi, minority counsel; George K. Johnson, Jr., James C. Smith, professional staff members, and Karen A. Love, staff assistant.

Also present: Buzz Hefti, assistant to Senator Warner.

Senator **WARNER**. The next panel, we hope to receive the testimony of Dr. Matthew Meselson, professor of biochemistry, Harvard University; and Mr. Fred Swartzendruber, former Laos representative, Mennonite Central Committee.

The Chair is informed that Dr. Meselson distributed his statement for presentation today. Is he present in the hearing room?

[No reponse.]

Senator **WARNER**. We will keep open the opportunity for this witness to appear later. So we will now start with Dr. Swartzendruber.

I would like to note that the subcommittee has made every effort possible to get all those who are interested in this subject and who have a view point on it to appear here at this hearing this afternoon.

We are grateful for your accepting the invitation.

Mr. **SWARTZENDRUBER**. Thank you, Mr. Chairman.

Senator **WARNER**. Do you have any prepared statements to hand out?

Mr. **SWARTZENDRUBER**. I have a prepared statement I would like to read and then I would like to be available for questions.

Mr. **WARNER**. Thank you very much. If you will read slowly, please.

STATEMENT OF FRED SWARTZENDRUBER, FORMER LAOS REPRESENTATIVE, MENNONITE CENTRAL COMMITTEE, WASHINGTON, D.C.

Mr. **SWARTZENDRUBER**. My background is in political science and international development.

My wife and I served in Laos as administrators of aid projects for the Mennonite Central Committee from 1979 until 1981. This agency is the relief and service arm of the North American and Canadian Mennonite Churches with about 500 workers in some 40 countries around the world.

One of our projects was located in North Central Laos in the area known as the Plaine des Jarres and officially known as Xiangkhoang Province. Because of this and other projects we were able to travel in Laos in areas populated by the H'Mong people. This was also true for staff of other agencies working in that area.

Because of the publicity surrounding claims of chemical attacks on the H'Mong, I was especially alert during these trips for any clues to abnormal activity. While it is true that the Lao Government imposes restrictions on foreigners in the capital city of Vientiane, I generally found that once I arrived in the provinces security restrictions were rather minimal.

On many occasions we had chance encounters with Vietnamese and even Soviet personnel, but at no time felt that they were particularly concerned by our presence as Americans, apart from a mild curiosity.

We saw H'Mong in a number of settings, hulling rice, buying and selling in the marketplace, walking along the roads, being treated in the province hospital and on occasion even cultivating small patches of opium poppies. They wore traditional clothing and as far as I could tell they seemed to be treated just as anyone else. In one province I saw H'Mong men carrying traditional homemade rifles.

Last year our agency was asked to provide saw mills, water buffalo, construction equipment, and other items for several H'Mong villages. The Xiangkhoang Province president was H'Mong and he represented one of the three distinct political divisions we observed in that area among the H'Mong, the first being H'Mong who had fought during the war on the side of the Pathet Lao, the second, those who had remained more or less neutral throughout the fighting, and the third category, those who had supported the U.S. faction led by General Vang Pao.

I had the occasion to meet a number of soldiers and pilots who had fought for the pro-U.S. Forces, including men who said they had been trained in the United States. Several of them said they were now in the provincial militia. They talked quite openly and freely and, although we heard a few complaints about low pay and restricted travel, they told me they had not been mistreated and denied that the H'Mong had been the subject of special punishment.

I was well aware that large numbers of H'Mong had left Laos for refugee camps in Thailand. I also knew from colleagues working in those camps that only a minority of those refugees appeared to know much about chemical attacks. Instead, they refer to bad economic conditions, unfair policies of local authorities, and resentment over resettlement aimed ostensibly at curbing slash-and-burn agriculture and opium growing.

Loa officials exhibited different attitudes toward the refugee flow. Some seemed to take the attitude of good riddance, viewing the refugees as potential troublemakers. Others expressed a fair amount of concern, and I believe it was for this reason that we were asked to provide aid to H'Mong villages last year.

These officials told me that there had indeed been clashes with H'Mong rebels, but they insisted that these had been rather limited in scope and had largely ended after a major military campaign in 1978 to 1979. This campaign, I was told, had crushed several groups operating in the area of Phou Bia Mountain, which is about 80 miles northeast of Vientiane.

It may well be that chemicals of some sort were used in this campaign. I would have no way of knowing. Certainly some of the refugee accounts I have read and heard sound like some sort of tear gas or harassing agent was used. On the other hand, a European colleague of mine who actually witnessed such an attack said it appeared to be a conventional attack with rockets and ground artillery.

I must confess I am puzzled by the continuing reports of widespread attacks since I found little evidence of security problems in the countryside. Apart from sporadic hit-and-run attacks by resistance groups based in Thailand, most in the border areas, the overall level of security seemed fairly good. Travel restrictions for foreigners such as myself eased a great deal after 1978.

I would have thought that chemical attacks in particular would have disrupted normal activities such as markets, travel, intermingling of different ethnic groups and so on. I saw no indication of such disruption and other Western staff told me they had the same experience in other parts of the country.

The airfields in the Plaine des Jarres had practically no security that I could see and lacked all but the most rudimentary ground facilities. I saw no decontamination equipment or other indications of military activity at those air bases. On the other hand, I recognized that there must be some basis for these numerous refugee accounts. I did not have access to every part of Laos. It is very hard after all to find negative evidence, evidence to show that something had not happened.

My own opinion is that these reports may stem from a relatively limited experience which has been distorted by storytelling and deliberate exaggeration.

Since returning from Laos I have spent considerable time studying this issue, and I have written an analysis of the issue which appeared in a periodical called Indo-China Issues in January of this year which I would like to request be entered in the record.

Senator WARNER. Without objection.

Mr. SWARTZENDRUBER. Thank you.

[The periodical referred to follows:]

January, 1982
INDOCHINA ISSUES 23

"Yellow Rain": Unanswered Questions

"There is certainly enough in the refugee reports alone to arouse concern that some chemical agent may be in use . . . Unfortunately, the search for the truth about yellow rain is not advanced by charges which are not backed up by adequate, scientifically sound data."

J. Fred Swartzendruber

"They attacked us with rockets from small airplanes.... Each plane carried four rockets and fired them two at one time. These rockets exploded on the ground and made yellow, white, and red smoke.... The white smoke was safe, but the yellow powder left a sticky powder on leaves and buildings.... When I breathed the gas one time, I became very sick. Within one hour or two I had diarrhea, headache, my stomach jumped up and down, it was very difficult to breathe, it felt like heavy pressure on my whole body, my vision was blurred and my eyes felt like popping out.... In this attack eight people died from breathing too much gas. They had heavy bleeding from the nose, they could not stop their bodies from shaking and died in several hours."

Thus Tou Yi Vang, former Hmong soldier in the forces still resisting the Communist government of Laos, now living in the United States, described an attack with chemical weapons in 1977. His testimony is typical of statements gathered by U.S. officials in recent years about what has come to be known as "yellow rain." But last autumn, the alleged use of chemical warfare by Vietnamese forces in Laos and Kampuchea became for the first time an issue in East-West relations.

"The Smoking Gun"

On September 13, 1981, during a trip to Berlin, Secretary of State Alexander Haig announced that U.S. scientists had identified toxins on a leaf sample from Kampuchea. "We now have physical evidence from Southeast Asia, which has been analyzed and found to contain abnormally high levels of three potent mycotoxins—poisonous substances not indigenous to the region," Haig said.

The next day in Washington, Undersecretary of State Walter Stoessel, Jr. stressed the "striking" similarities between the symptoms reported by refugees and the medical effects of mycotoxin poisoning. However, because the evidence was limited to one leaf and stem, Stoessel characterized the findings as "strong and compelling, but nonetheless preliminary evidence that the lethal agents used are mycotoxins."

Administration officials argued that tricothecene mycotoxins do not occur in the warm climates of Southeast Asia, and said that no known facilities in Indochina could have produced the chemicals in the quanitities believed to have been used. While they did not directly accuse the Soviet Union of involvement, U.S. officials told reporters that the Soviet Union "does have the necessary facilities to easily produce the quantities reported."

The State Department was criticized for its handling of the issue, particularly by scientists distressed by the heavy publicity surrounding analysis of a single sample collected without controls. Moreover, the timing of

J. Fred Swartzendruber represented the Mennonite Central Committee in Laos from 1979 to 1981, and travelled extensively in the country working on aid projects.

A publication of the Center for International Policy, Indochina Project

The low level of tricothecenes in the samples raises the question of what the other 99.995 percent of the sample consisted of.

Haig's reference to alleged Soviet involvement in chemical warfare in Southeast Asia seemed to some defense analysts to be related to the Administration's desire to build support for funding of new chemical weapons by the United States.

On November 10, the State Department presented additional evidence. Richard Burt, director of the Bureau of Politico-Military Affairs, led a panel of government witnesses before a special hearing of the Senate Subcommittee on Arms Control, Oceans, International Operations and Environment. Burt revealed that laboratory analysis of three more samples from Southeast Asia had also tested positive for tricothecene mycotoxins. A "control sample," one chosen from a different location where no attack had taken place, had proven negative, he said.

"We now have the smoking gun," Burt announced. He claimed the "fit" between the medical effects of the toxins and the symptoms reported by refugees was "perfect." Furthermore, Soviet laboratories, under military control, were engaged in mycotoxin research, he said, and the Soviet Union provides military aid and advisors to Vietnam and Laos. He went on to elaborate the evidence that chemical warfare, supported by the Soviets, is being used against groups resisting the governments supported by Vietnam in Laos and Kampuchea.

In late November, the United Nations released the report of a team appointed to investigate the chemical warfare charges after a U.S.-sponsored resolution on "yellow rain" passed the U.N. General Assembly in December, 1980. The team, composed of experts from Egypt, Kenya, the Philippines and Peru, was only able to visit three refugee camps in Thailand during the course of its 11-day investigation. The Indochinese countries, along with the Soviet Union, denounced the charges and refused to allow the team access to areas alleged to have been sites of chemical warfare.

The U.N. team reported that it was "unable to reach a final conclusion as to whether or not chemical warfare agents had been used" in the region. While the team stressed that it had no reason to question the integrity of refugees recounting chemical warfare attacks, it emphasized that no conclusions could be drawn without considering the objectivity and technical competence of eyewitnesses. As for the physical samples the team was given, the report said, "Since the Group cannot ascertain the actual source of these samples, it cannot base its final conclusions on the results of such analysis." The report repeatedly pointed to the problem of "timely access to the areas of alleged use," and to the inadvisability of basing conclusions on samples collected by "other than impartial means."

The U.N. investigation was sharply criticized by those who had already accepted the State Department's case. *The Wall Street Journal* charged the U.N. report with "whitewashing yellow rain," and said it was not surprised by the team's conclusions "given the inadequacy of the UN's investigation."

The State Department's findings and the U.N. team's inconclusive and cautious report have generated considerable controversy over the significance of the evidence so far produced in support of the charges of chemical warfare. The dispute centers on the reliability and accuracy of the refugee reports, the authenticity and proper interpretation of the physical samples, and the absence of certain other corroborating evidence.

The Refugee Accounts

American officials analyzing chemical warfare allegations in Indochina have long been convinced of their truth by the volume, detail, and consistency of reports from Hmong refugees from northern Laos. These Hmong, usually former soldiers of the CIA-sponsored army of General Vang Pao and their families, have described, in vivid terms, attacks by airplanes spraying "yellow rain" on remote villages. Refugees say victims experience vomiting and diarrhea, often with blood, and sometimes death. Animals reportedly die in great numbers, and in some cases, water supplies and crops are said to become so contaminated that additional casualties are caused by eating food or drinking water.

U.S. officials admit that not all the refugee accounts are necessarily precise on technical points, but say they believe that the pattern of reports over a period of years is too significant to be dismissed. The State Department's main specialist on "yellow rain," Fred Celec, said in an interview that he was "struck by the consistency of the reports," especially in view of the fact that many different people from different villages were saying the same things over a considerable period of time. Celec, conceding that Hmong men have a reputation for exaggeration and storytelling, nevertheless argued that it is significant that women and children, who are less likely to do so, corroborate these stories.

Celec emphasized that the medical symptoms associated with death are consistently linked with the appearance of a yellow powder or gas. Other symptoms, he said, seem to be associated with variously colored agents, which are often not fatal. The U.S. Army Medical Corps dispatched a small team of investigators to Thai refugee camps in late 1979, and concluded from Hmong interviews that three types of chemical weapons were in use in Laos: a nerve agent, a chemical attacking

The United States would not specify to the U.N. investigators precisely where the samples came from, who collected them, or under what circumstances.

the skin, and an unknown agent causing bleeding.

But the consistency of these refugee reports is disputed by independent scientists and chemical warfare specialists. One former U.S. government specialist, with long experience in the field, says that the various reports he has read "just do not add up." So many details are confusing or contradictory, he says, that it is doubtful they could be based on the actual use of chemical warfare. In some cases, witnesses have been vague on details; in others, they are obviously confused or perhaps exaggerating.

The U.N. team did not take literally, for example, the testimony it was given that chemical agents had been disseminated by aircraft flying at 7,000 feet. The team pointed out that the chemicals could not retain an effective concentration when sprayed so high above a target. "Similarly," the team continued, "such aerial spraying could not possibly effect—as it was alleged to have done—water supplies to produce toxicity and death, produce holes in the leaves of the trees or destroy soft tissue down to the bone."

Reports of lethal chemical warfare from highland peoples in Indochina have not always been taken as literally true. During the Vietnam War, Montagnards in the central highlands of South Vietnam, who were under Saigon government control, consistently claimed that American spraying of herbicides was killing large numbers of people, especially children, and was seriously affecting many others whose villages lay in the flight paths of defoliation missions. A study carried out by the National Academy of Science, under contract to the U.S. Department of Defense, was unable to explain this phenomenon. Interviewers were convinced of the sincerity of the Montagnards and impressed by their command of details of the overflights. But scientists ruled out the possibility that the herbicide could cause the symptoms reported: dizziness, fever, cramps, skin rash, vomiting and even death.

During the war, some observers, disturbed by these claims, speculated that U.S. forces were experimenting with chemical weapons. U.S. government officials derided such suspicions, suggesting the reports were the result of a confused understanding of cause and effect, or of Communist propaganda. The State Department's Fred Celec, reminded of this earlier episode of what the Montagnards called "medicine from the sky," theorized that the North Vietnamese were even then experimenting with Soviet-supplied chemicals and blaming the results on American defoliation operations.

Significantly, the reports of chemical warfare in Kampuchea appear to emanate almost entirely from the Pol Pot military organization. Apart from several Thai reports of Vietnamese soldiers dumping cyanide into wells and streams, the only allegations of the use of chemical weapons have come from the Khmer Rouge. General Dien Del, commander of the Khmer People's National Liberation Front, the non-Communist resistance organization, told the Reuters news agency after Haig's Berlin speech in September that his forces "had never been attacked by chemical weapons."

CHINA
BURMA
VIETNAM
LAOS
THAILAND
KAMPUCHEA
PHILIPPINES
MALAYSIA
INDONESIA
SINGAPORE

Because most of the reports about chemical warfare in Kampuchea come from Khmer Rouge sources, State Department officials concede that the case there is considerably less compelling than in Laos. Celec admitted that it is sometimes difficult to know whether "we are hearing our own reports played back to us."

Assessing the Physical Evidence

Leaves, pieces of clothing, blood and tissue samples have all been presented to U.S. officials in recent years to support claims that chemical attacks have taken place. The State Department now explains the failure of laboratory tests to reveal any toxic chemical residue by referring to the alleged use of a novel chemical weapon: tricothecene toxins. Tests for the standard military chemicals, such as mustard, phosgene, or nerve agents, could not reveal the presence of mycotoxins which are difficult to detect even with the most sophisticated equipment, according to the State Department.

The State Department's case now rests heavily on four separate pieces of physical evidence, two of which are said to come from a village in Kampuchea, the other two from Laos. The dosages detected on the samples, while not uniform from one sample to the next and

Some scientists have asked why one leaf, a bit of pond water and two small rock scrapings are the only physical evidence available.

based on admittedly small samples, were much higher than those found in nature. For one of the toxins, T2, the level was said to be 20 times the highest known natural incidence of the toxin, and one of the subsequent samples revealed T2 at some 50 times this concentration, according to the State Department's Richard Burt.

The table below displays the findings from tests of the physical samples obtained by the State Department, as assembled from State Department press releases and submissions to the United Nations. The figures indicate tricothecene toxins, registered in parts per million (ppm) dry weight, found on samples of "yellow rain" from Kampuchea and Laos.

Scientists raise a number of issues about the data revealed in the table. *Science*, the journal of the American Association for the Advancement of Science, reports that Dr. Chester Mirocha of the University of Minnesota, the scientist who carried out the tests on the leaf sample, was surprised to learn that leaf fragments A and B were actually from the same leaf. If the toxins had been produced in a military laboratory as suggested by the State Department, the toxins would have been expected to be present in both fragments in the same relative proportions. The test results shown in the table might suggest natural occurrence since, as Dr. Mirocha observed, "variability is to be expected in nature."

Another issue about the samples which has been raised by Dr. Daniel Cullen, a University of Wisconsin plant pathologist who did his doctoral research on tricothecenes, is why the level of those toxins is so low in the samples. Cullen points out that, while the levels of tricothecenes found in the samples is high in terms of natural occurrence, "as supposedly pure 'yellow rain,' they should have been approaching one million parts per million instead of 50 or 100 parts per million."

Dr. Matthew Meselson, a Harvard biochemist and authority on chemical warfare, argues that the low concentration of tricothecenes in the samples suggests that they would be a relatively ineffective chemical weapon. "If the concentration is as low as 50 to 100 parts per million," Meselson says, "then the delivery of lethal doses would appear to require the laying down of gigantic quantities of 'yellow rain' per unit area, which would be orders of magnitude greater than that required for conventional warfare agents."

The low level of tricothecenes in the samples also raises the question of what the other 99.995 percent of the sample consisted of. Dr. Mirocha confirms that his instructions from the State Department were specifically to look for tricothecenes such as T2, and not to identify other substances. Since the sample was disposed of, it is now too late to retest to find out what substance or substances made up the bulk of the sample.

Discovering the nature of those substances might have offered some clue to the "yellow rain" mystery. It might have indicated that there were other, more potent toxins in the sample, given some indication of how or where the compound was manufactured, or shown that the compound was an essentially harmless substance which is normally used for other purposes. In short, it could be far more informative than the finding of tricothecenes in such small amounts.

But the most serious issue surrounding the physical samples is their origin. According to the State Department, the leaf came from a village attacked early in 1981 near the Thai-Kampuchean border. The water was collected from a stagnant pond in the same village, and the control samples of soil and leaves were collected

SAMPLES

Toxins	*leaf*	*fragments**	*pond water*	*rock*	*scrapings*	*controls*
	A	B	(10 ml)	A	B***	
T2	3.15	35.0**	—	150.0	—	—
Nivalenol	109.0	22.0	—	—	—	—
Deoxynivalenol	59.1	—	66.0	—	—	—
Diacetoxyscirpenol	—	—	?	?	10 nanograms****	—

*Leaf was split, each part weighing 0.2 grams.

**This portion was "spiked" with 300ppm T2 as a test of the analytic technique.

***This sample was extremely small, reportedly much less than 0.1 mg.

****Finding of 10-billionths of a gram Diacetoxyscirpenol subject to considerable measurement error.

Scientists question whether there is really a close fit between the symptoms reported by refugees and the physical symptoms of mycotoxin poisoning.

nearby. The powder scraped from rocks in Laos was brought to the Ban Vinai refugee camp, according to the Administration.

But the path of these samples from their point of origin to the State Department remains shrouded in mystery. *Time* magazine reported that the Kampuchean samples were collected by a Thai army patrol passing through an area that had recently experienced a "yellow rain" attack. The *Washington Post* reported diplomats in Bangkok as saying that the samples had been provided by the Khmer Rouge. The State Department has denied that the Khmer Rouge collected the samples, but refuses to elaborate. The origin of the rock scrapings is equally obscure. The State Department says one sample was handed over to U.S. officials directly, but has not identified the source. The other was given to *Soldier of Fortune*, a magazine for mercenaries, which had a team visiting the camp.

The United States also would not specify to the U.N. investigators precisely where the samples came from, who collected them, or under what circumstances. To date, press inquiries on this point have met with firm refusals from the U.S. government to provide more detail. The unanswered question of who collected the samples and how is crucial, since, on the one hand, scientists see other possible explanations for the presence of mycotoxins, and on the other hand, biochemists say tricothecenes are relatively easy to produce in small quantities.

The U.N. team said it needed additional information: precisely where and when the samples were obtained, when the chemical exposure took place and how much time had elapsed before the sample was collected, whether there had been any rainfall, what the temperature had been during the period, whether other samples had been collected, and whether the leaf samples had come from living or dead plants or from the ground. More importantly, the team wanted to know whether any tests had been carried out to seek fungi which might have produced the toxins. Scientists stress that, unless a complete description is available of the ecology from which the samples were taken, it is impossible to say with certainty how a given toxin came to be there.

Testifying before the same Senate committee as Richard Burt was Dr. Matthew Meselson. Meselson cautioned that almost all that is known about tricothecenes comes from the study of food crops and that until recently no effort was made to study their possible presence in noncrop plants. To conclude that toxins detected on small samples without rigorous controls were the result of chemical warfare would be highly premature, he asserted.

Meselson argued that the State Department's earlier claim that the tricothecene toxins are not native to warm climates, i.e., Southeast Asia is "almost certainly false." Natural outbreaks of tricothecene toxins have occurred in India and laboratory tests have shown that large quantities of some of these toxins are produced at temperatures of 80 degrees Fahrenheit. Since Meselson's testimony, the State Department has qualified its position that mycotoxins cannot occur naturally in Southeast Asia.

Meselson speculates that, in the case of the leaf samples from Kampuchea, fungi could have infested the roots of the plant or the soil around the plant, producing toxins picked up by the plant and spread throughout the system. The U.N. team evidently had the same possibility in mind when it asked whether tests for fungi near the sample had been carried out.

The Missing Pieces of Evidence

Apart from the ambiguities surrounding the origins and significance of these samples, there are other unresolved questions about the evidence for chemical warfare in Laos and Kampuchea. In the first place, some scientists have asked why one leaf, a bit of pond water and two small rock scrapings are the only physical evidence available. Celec has explained the paucity of physical samples as the result of the alleged volatility of the mycotoxins. They disappear quickly after an attack, he argues, leaving little or no evidence behind.

Scientists, however, contradict the claim that samples are impossible to obtain due to the rapid disappearance of the chemicals. Dr. Cullen of the University of Wisconsin argues that mycotoxins are "stable in the environment and would leave a residue." And although heavy rains might wash away such residue, the U.S. government submission to the U.N. investigation noted that "yellow rain" attacks usually occur during the dry season.

Burt argued, on the other hand, that it was extremely dangerous to collect samples, citing the case of a person who collected the sample of water becoming gravely ill after spilling some of it on himself. However, Dr. Meselson calculated that at a dosage of 66 parts per million, as indicated in Mirocha's analysis, one would need to drink several gallons of contaminated water to experience severe symptoms.

Another gap in the evidence is the absence of medical findings of chemical exposure among those claiming to have just suffered from "yellow rain" attacks, particularly in the accessible areas along the Thai—Kampuchea border. Blood samples were recently obtained

> "I don't see how aerial spraying could result in dosages as high as those administered to the pig in the ABC program."

by the State Department from nine victims of an alleged attack in Kampuchea last fall, but too much time had elapsed before the samples were taken resulting in ambiguous findings (see box).

The U.N. team examined and took blood and urine samples from six people who said they they had walked through a field covered with yellow powder 23 days earlier. The team concluded, "No clear characteristic physical findings of exposure to chemical agents could be recorded, and [laboratory analysis] yielded no significant abnormalities." They found only a goiter, an enlarged spleen and skin conditions consistent with scabies, superficial infections and contact dermatitis. Furthermore, the team reported that "medical personnel interviewed in the refugee camps stated that they did not come across cases which could be attributed to chemical warfare agents."

Finally, if chemical weapons have been used on a large scale in Kampuchea, where reports usually mention delivery by artillery shells or rockets rather than by aircraft as in Laos, there should be evidence available in the form of empty shell casings, rocket fragments or "dud" rounds. In either case, one would expect markings identifying the round as a chemical weapon and at least some traces of identifiable chemical inside. Although resistance forces frequently claim possession of such proof, none has been provided to date.

Moreover, scientists question whether there is really a close fit between the symptoms reported by refugees and the physical symptoms of mycotoxin poisoning. Both Dr. James Bamburg, co-discoverer of the T2 mycotoxin, and Dr. Mirocha, who analyzed the samples for the State Department, say they have difficulty with the assumption that rapid hemorrhaging would be caused by mycotoxin poisoning.

An experiment done at the University of Illinois and reported in the recent ABC documentary on "yellow rain" showed that a pig force-fed massive doses of T2 died after stomach bleeding. But Dr. Bamberg questions whether this proves anything, since one would have to assume that human beings would ingest similarly massive doses of the toxin. "I don't see how aerial spraying

Blood Samples: More Unanswered Questions

Readers of the *Washington Post* may have concluded on January 30 that the question of "yellow rain" had been resolved once and for all. "Blood Tests Prove Weapons Biological, State Dept. Says," the *Post* headline declared. The article reported that the State Department had charged that blood samples from nine victims of a chemical attack last fall in Kampuchea "indicate that the Soviet-backed government there is using biological weapons."

What the story failed to report was the actual report on the analysis of the blood samples released by the State Department. That report avoids claiming that the samples provide unequivocal evidence of the presence of mycotoxins in the blood samples. It uses the cautious phrase "tentative identification" and points out that the trace of the chemical in question was so slight that it "precluded unequivocal identification." Scientists familiar with the methods used to identify tricocethenes say that the equivocation by Dr. Chester Mirocha, who did the tests for the State Department, on whether tricocethenes were actually present in two of the blood samples suggests that serious doubts remain in his mind.

The following are key passages from the report:

"A trend toward depressed white cell count in the individuals exposed to chemical agent was observed… White cell counts of two of the control individuals also were slightly depressed… however; and the sampling size was so limited that there was no real statistical difference between control and exposed groups….

* * *

"The presence of detectable amounts of HT2 [a metabolite of T2 toxin] is surprising and somewhat disturbing…. It is believed to be unlikely that metabolites of the tricothecene toxins would be detectable in blood by 72 to 96 hours after an attack…. The tentative identification of HT2 toxin in the blood of the victims several weeks after exposure seems to indicate the presence of a depot or storage site for tricothecenes within the body…. Further experimental research is needed to define the extent of this problem."

* * *

"*The tentative identification of HT2* in the blood of two victims, and the *trend toward depressed white cell counts* in these same victims, *cannot be taken as conclusive scientific proof of toxin exposure* since the trace amount of the compound present precluded unequivocal identification and quantitation [sic], and also because many other medical problems in addition to toxin exposure can cause a decrease in white cell counts." [emphasis in original]

Another possible explanation for "yellow rain," which has apparently never been seriously addressed by government analysts, is that riot control agents could account for many of the reports.

could result in dosages as high as those administered to the pig in the ABC program," he said.

The classic case in which human beings suffered from natural mycotoxin poisoning was an outbreak from eating contaminated grain in the Soviet Ukraine during World War II. (Even in that case, it has not been established conclusively which mycotoxin was responsible). The symptoms reported by those affected by the poisoning were inflamation of the skin and mucous membranes, vomiting, bone marrow depression and a reduced white blood cell count, but not rapid internal hemorrhaging or external bleeding.

In short, research on tricothecenes is still in its infancy. No one knows how the symptoms of tricothecene poisoning in humans by inhalation or skin contact would differ from the results of force-feeding such toxins to pigs. Further confusing the issue is the fact that so many refugee reports are ambiguous about the exact symptoms suffered after an alleged "yellow rain" attack. It is unclear how many of them actually claim to have suffered rapid internal hemorrhaging, and how many instead coughed up blood after prolonged retching.

Another possible explanation for "yellow rain," which has apparently never been seriously addressed by government analysts, is that riot control agents could account for many of the reports. One such agent, DM, causes violent vomiting and was supplied in grenades containing tear gas to South Vietnamese forces during the early 1960s. Such agents may be fatal in heavy doses or when used against victims weakened by disease or malnutrition. Dr. Meselson also notes that DM may turn orange or red with age, and questions why so little attention has been given to the hypothesis that "yellow rain" may have its basis in the use of such agents, because most lethal chemicals are colorless.

DM produces highly toxic arsenic compounds when dissolved in water, a characteristic that could explain why refugees in both Laos and Kampuchea claim that people become ill or die after drinking water contaminated with "yellow rain." Meselson has urged that such hypotheses be carefully examined before accepting the conclusion that tricothecenes are the cause of such incidents. For example, he suggests that hair samples be tested for arsenic, which is deposited there after even minor exposure.

Further evidence of the riot control gas hypothesis comes from an account by a defecting Vietnamese artillery officer who told Western reporters in early 1980 that non-lethal gas was used "to disperse the enemy or temporarily put it out of combat," and that the artillery shells used came from the Soviet Union, China and old American stocks.

The State Department's claim to have a "smoking gun" which proves the use of mycotoxins in Laos and Kampuchea appears, in light of these contradictions, unanswered questions and major gaps in the evidence, to be a case of basing a very far-reaching conclusion on data that is still very thin. At the same time, there are far too many reports from refugees leaving Laos to dismiss their stories as totally fabricated.

There is certainly enough in the refugee reports alone to arouse concern that some chemical agent may be in use which, under some circumstances, at least, has been lethal. These reports require the most thorough and impartial investigation possible. Unfortunately, the search for the truth about "yellow rain" is not advanced by charges which are not backed up by adequate, scientifically sound data.

Mr. **SWARTZENDRUBER**. I was particularly disturbed that no systematic effort has yet been made to survey refugees of various ethnic and political backgrounds in different refugee camps. I have suggested this measure to American officials for over 2 years now and have received a lukewarm welcome at best.

In my impression, the number of reports of chemical attacks has been very small in proportion to the total number of refugees who have left Laos, and this includes H'Mong refugees. The U.S. Army medical team which went to the Ban Vinai refugee camp in late 1979 returned with 43 accounts of so-called yellow rain of which 39 were usable. Yet the population of this single camp has averaged well over 30,000 for several years, at times approaching 40,000.

Does this mean that all of the people in those camps say chemicals are being used? Do refugees in other camps who are not H'Mong or are not members of resistance groups confirm these stories? Such questions require serious attention. To my knowledge they have not yet been approached.

A National Academy of Science study done under contract to the Department of Defense reported in 1974 that Montagnard tribesmen in the Central Highlands of South Vietnam were blaming American defoliants such as agent orange for a large number of deaths and illnesses in their villages. I have a copy of the pertinent section of that report which I would also ask to be placed in the record.

Senator **WARNER**. Without objection.

[The report referred to follows:]

THE EFFECTS OF HERBICIDES IN SOUTH VIETNAM

PART A—SUMMARY AND CONCLUSIONS

(Committee on the Effects of Herbicides in Vietnam, Division of Biological Sciences, Assembly of Life Sciences, National Research Council)

Perceived effects of herbicides in the highlands

The purpose of the research on the Highlands was to assess the perceptions of Montagnards concerning the effects of herbicides. Due to the timing of this study and problems of security, it was not possible to check the views of these people by observations on plants and animals or by medical examination of people.

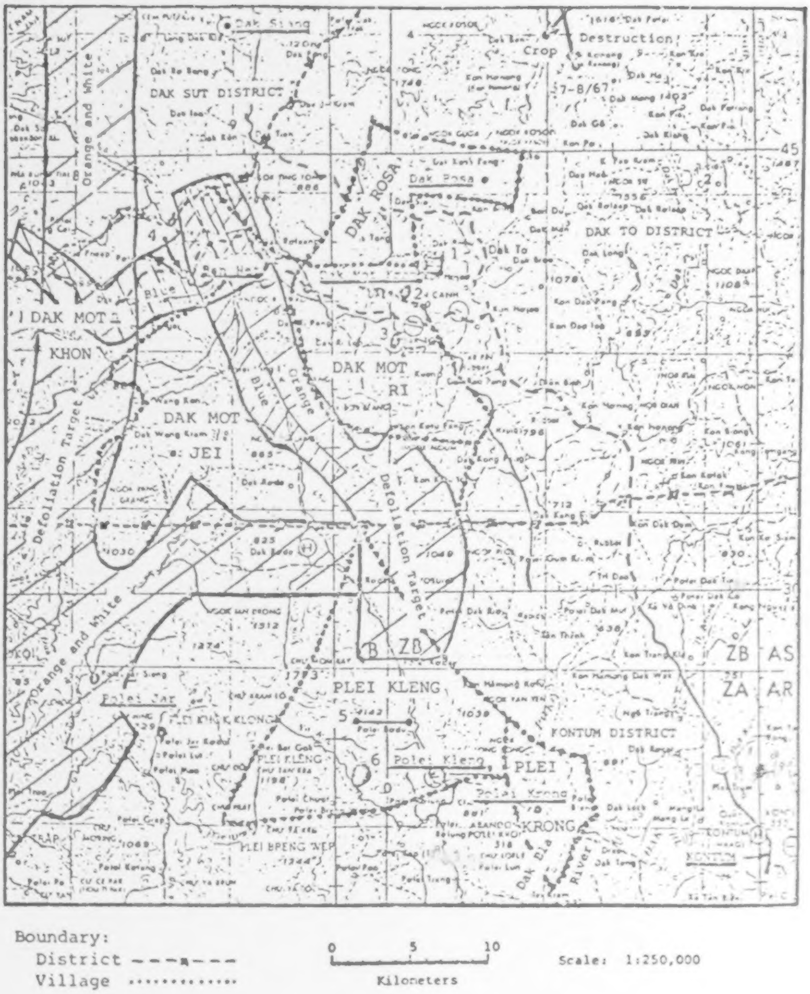
The techniques used in this study were intensive interviews with over 30 key Montagnard informants from twelve villages who had been relocated in five refugee centers in Kontum, Pleiku and Darlac provinces. Location at the time of interview, original location, ethnic background, and characteristics of the interview subjects are listed in Table VII B-10. These people had been relocated as a result of the Spring 1972 offensive. The people interviewed represented several ethnolinguistic groups: Halang, Jarai Arap, Jarai To-Buan, Rengao, and Sedang. A Hroy Highlander, who had been trained in Hanoi as an agricultural engineer and had served as an agricultural advisor with NLF forces in the border area before defecting to the RVN side, was also intensively interviewed. Interviews were conducted by an American anthropologist with over a decade of experience in Vietnam. He used the advice and assistance of interpreters all of whom were employed by the U.S. Government at the time of the research. They spoke the various dialects involved, and translated into English or French. At times the anthropologist talked directly in Vietnamese with interview respondents.

The interpreters were briefed prior to the interviews to clarify terminology and references to various kinds of herbicide sprays and effects. Interview subjects were sought from locations believed to have been sprayed on the basis of recorded herbicide mission data. An attempt was made to locate as precisely as possible both the settlements and swiddens of the respondents and the herbicide missions to which they were exposed. A comparison of herbicide mission data from HERBS tape printouts with areas inhabited by the respondents suggests that they were living in close proximity to targets for defoliation and/or crop destruction missions. The greatest distance any group of settlements appear to have been from target coordinates is about 15 km or 9 mi (see Figs. VII B-9, B-10, and B-11).

Table VII-B-10

Characteristics of Persons Interviewed in the Highlands

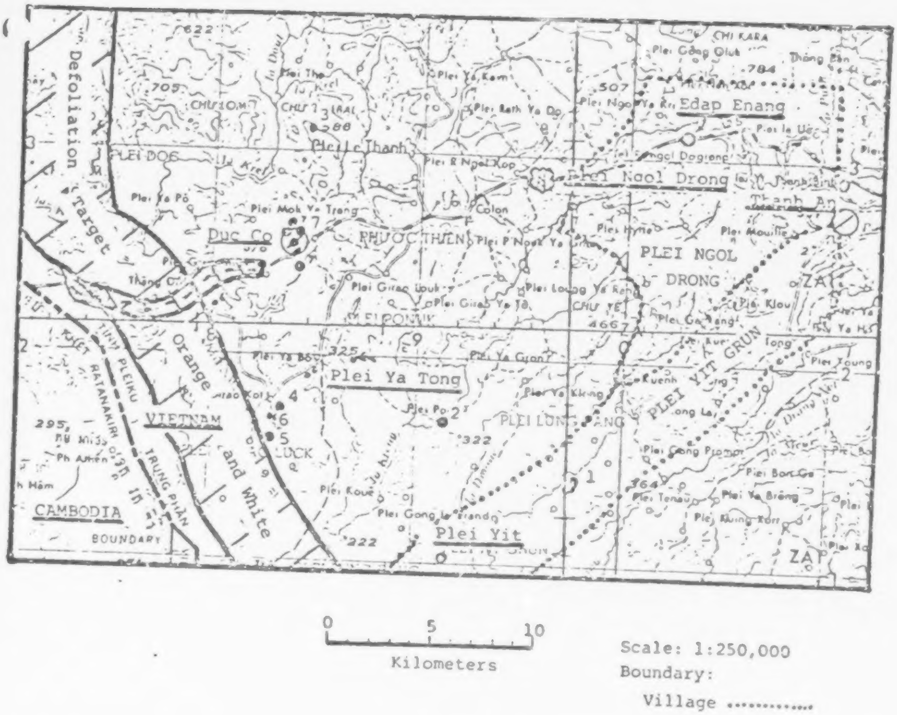
Location of Interviews	Original Village of Respondents	Ethnic Group	Characteristics of Principal Interview Subjects, Principal Respondents
I. Dam San Refugee Center, Darlac Prov.	1. Long Djon, near Dak To Distr. Hq., Kontum Prov.	Sedang	Two young men, one older woman
	2. Dak Rosa, near Dak To, Kontum Prov.	Sedang	Older man
	3. Dak Tang Plun, near Tan-Canh, Dak-To Distr., Kontum Prov.	Halang	Several older men, several women, two younger men
	4. Plei Ro-O near Polei Kleng, 30 km west of Kontum City	Jarai Arap	Young man (NLF defector) Several women
II. Mary Lou (Ngok Long) Refugee Center, Kontum Prov.	1. Dak Mot-Khon, west of Tan Canh, Dak To District, Kontum Prov.	Sedang	Village chief
	2. Dak Mot-Tri, west of Tan-Canh, Dak To District, Kontum Prov.	Sedang	Hamlet chief
	3. Dak Siang Ranger Camp Dependent's Settlement, northwest of Dak To Distr. Hq., Kontum Prov.	Halang	Young woman, her father, older man, older woman
III. Plei Don Refugee Group	1. Polei Krong cluster of villages, west of Kontum City	Jarai Arap	Man
		Halang	Man
		Rengao	Man
	2. Polei Krong, cluster of villages, west of Kontum City	Rengao	Older men
		Jarai Arap	Older men
IV. Prisoner of War Refugee Center, Pleiku Prov.	1. Polei Kleng, west of Kontum City	Jarai Arap	Young hamlet chief Older woman Older man
	2. Plei Jar Tum, west of Kontum City	Jarai Arap	2 men 3 women
V. Camp Enari Refugee Center, Pleiku Province	1. Plei Ea Tung Hamlet, Plei Ngol-Drong Village near Edap Enang Resettlement Center, Rte. 19	Jarai To-Buan	2 men
VI. Highlander	Phu-Bon and Phu-Yen	Hroy	Man, follower of Viet Minh, moved to North in 1954, trained as Agricultural Engineer in Hanoi University, returned to highlands area astride Phu-Yen/Phu-Bon border in 1969, organized food production for NLF, had "rallied" to GVN at time of interview.


Dak Siang
DAK SUT DISTRICT
Crop
Destruction
7-8/67
Orange and White
DAK ROSA
Dak Rosa
DAK TO DISTRICT
Dak To
Blue
Ban Hea
DAK MOT
KHON
DAK MOT
RI
Blue
Orange
DAK MOT
JEI
Defoliation Target
Defoliation Target
Orange and White
Orange and White
B
ZB
PLEI KLENG
Polei Jar
Polei Kleng
PLEI
Polei Krong
KRONG
KONTUM DISTRICT
Dak Bla River
ZB
AS
ZA
AR
45
30
1
2
3
4
5
6
Boundary:
District
Village
0
5
10
Kilometers
Scale: 1:250,000

Key to Special Targets

1. Aug 68 - 800 gallons White - NLF cache site
2. Aug 68 - 100 gallons White - Military perimeter
3. Aug 68 - 100 gallons White - Military perimeter
4. Aug 67 -1100 Gallons Blue - Crop destruction
5. Nov 68 - 200 gallons White - Military perimeter
6. May 69 - 770 gallons White - Military perimeter

Fig. VII B-9. Informant Settlement Areas and Herbicide Missions in Kontum Province.


Defoliation Target
Orange and White
Duc Co
Edap Enang
Plei Ngol Drong
Thanh An
PLEI NGOL DRONG
PHUOC THIEN
Plei Ya Tong
Plei Yit
PLEI YIT GRUN
PLEI LUNG ANG
VIETNAM
CAMBODIA
BOUNDARY
PLEIKU
RATANAKIRI
TRUNG PHAN
CHI KARA
ZA
0
5
10
Kilometers
Scale: 1:250,000
Boundary:
Village

Key to Special Targets:

Agent White	Objective
1. 27 Sept 68 - 550 gallons -	Enemy cache site
2. 24 Oct 68 - 100 gallons -	Crop destruction
3. 28 Oct 68 - 100 gallons -	Military perimeter
4. 29 Oct 68 - 100 gallons -	Military perimeter
5. 1 Nov 68 - 100 gallons -	Military perimeter
6. 10 June 69 - 220 gallons -	Military perimeter

Agent Orange

7. 6-30 Nov 65 - 5800 gallons-Defoliation near Highway 19*

*Only one target coordinate given for each of the five missions.

Fig. VII B-10. Informant Settlement Areas and Herbicide Missions in Pleiku Province.

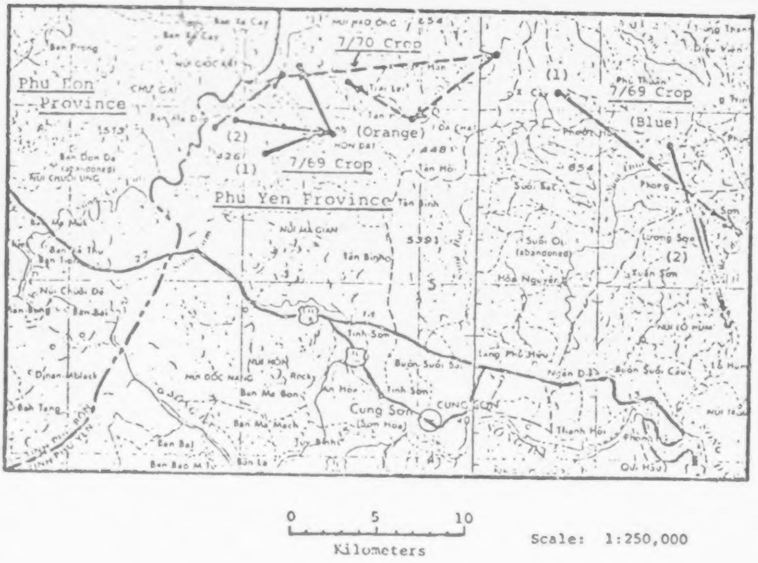

Phu Bon Province
7/70 Crop
(2)
(1)
(Orange)
7/69 Crop
(1)
7/69 Crop
(Blue)
(2)
Phu Yen Province
Cung Son
0 5 10
Kilometers
Scale: 1:250,000

Fig. VII B-11. The NLF Food Production Area Phu Yen/Phu Bon Border Region.

Respondents were asked about settlement patterns, locations of farming areas, types of crops grown, and other economic activities. They were then asked about their perceptions of spraying: whether or not they had seen the aircraft, and their perceived effects of the spray. Interviews were repeated with respondents in the Dam San Refugee Center, and with the group at Plei Don in Kontum Province (I and III in Table VII B–10). The subjects were very responsive, their general opinions regarding herbicide effects appeared clear, though their quantitative information was sometimes vague. The respondents were in general agreement that there had been many herbicide operations on or near their settlements and swiddens since 1967. This was confirmed by herbicide mission records which show that the major spraying effort near the respondents began in 1967 and ended in 1970. Information on general agricultural patterns of the groups represented had been gathered in previous ethnographic field work since 1965.

(a) Agricultural practices

Among the Highland people of SVN, a wide variety of agricultural practices is found, ranging from wet-rice paddy farming such as is found among the Vietnamese, to swidden farming. All of the villagers interviewed in this study rely on the swidden technique, and this also was the method employed in NLF food production in Phu-Yen Province as described by the Hroy respondent.

Although the swidden farming techniques vary from group to group, there are some common basic characteristics, particularly among the groups in Pleiku and Kontum. Essentially, swidden farming in Highland SVN is a system of rotating agriculture wherein a given field is cleared, the cut wood burned, and the land afterward farmed for a duration of years that depends on the adjudged fertility of the soil. The field then is left to fallow, until a new growth of trees appears, and eventually it is farmed again.

Among the Jarai, Halang, Rengao, Sedang, and Hroy, the work of preparing the fields for farming usually begins in January or February. Men perform the heavier tasks such as felling trees (large trees normally are left standing) while women and children cut the brush. When the wood has dried, it is gathered together and burned. The larger logs are set ablaze, and the fires are controlled as much as possible. When the rains begin, normally in mid-April or early May, the crops are planted; the men make holes in the ground with dibble sticks while the women follow up to plant the seeds.

The staple crop is upland dry rice, and several varieties with varying maturity periods (usually three to six months) are planted by all of the groups. Also, maize is cultivated in the swiddens as are a number of secondary crops. These include manioc (a major crop in the Phu-Yen Province NLF food production area), sugarcane, bananas, pineapples, eggplant, onions, yams, cabbage, chili peppers, and various kinds of tuber plants. Papaya trees are planted around the edge of the swidden. Many of these same crops are grown in kitchen gardens located in the villages, and the gardens may also contain tobacco, green leafy vegetables, and lemon grass. In some villages, coconut and mango trees are grown. Small huts are constructed near the swiddens so the young men can guard the fields against marauding animals during the growing season.

(b) Results of interviews

Most informants report having seen the herbicide spraying and give accurate descriptions of the aircraft. From the interviews it appeared the forest or sometimes the swiddens, not the villages, were the targets although spray sometimes drifted into the villages.

A difficult area of inquiry concerned possible deaths due to the herbicides. Sickness and death are common occurrences in Highland villages, and infant mortality is particularly high. In addition, NLF/DRVN propaganda about the harmful effects of the sprayed chemicals, which began in 1962, stressed the fact that human beings—especially children—might fall ill and die if exposed; and both the RVN and NLF/DRVN charged that water and food supplies were being poisoned by the opposing side in order to kill the inhabitants.

The interview subjects consistently reported that illness occurred among people who lived in or near the sprayed areas. The most common symptoms reported were abdominal pains and diarrhea, with vomiting, respiratory symptoms and rashes also frequently reported (Table VII B–11). Some respondents said that there were unusually high numbers of deaths, particularly among children following the spraying.

Table VII—B-11. Illness Perceived by Highlanders Following Herbicide Spraying

Location	Symptoms	People Affected, Deaths
I.1 Long Djon	Abdominal pains, diarrhea, nasal irritation, coughs lasting more than a month	More children than adults were affected "many children died"
I.2 Dak Rosa	Abdominal pains, diarrhea, skin rashes looking like insect bites following contact with sprayed vegetation	Several children died; "unusual number" of still-births among exposed mothers
I.3 Dak Tang	Diarrhea, cramps, skin rashes, fevers	Many children became ill, an estimated 30 died
I.4 Plei Ro-O	Diarrhea, cramps, rashes, fever, coughing blood	Thirty-eight children reported to have died as a result of eating sprayed crops
II.3 Dak Siang	Diarrhea and abdominal pains after drinking water from stream in sprayed area, dizzyness and vomiting after eating bamboo shoots from sprayed area	Some children died after drinking water from sprayed area
II.1,2 Polei Krong	Diarrhea, cramps, fever, rash looking like burns with small blisters over red areas	Higher than usual number of children died after spraying
IV.1 Plei Kleng	Diarrhea, vomiting, fever within one day of spraying	About 40 adults and children died with these symptoms
IV.2 Plei Jar Tum	Diarrhea, vomiting, fever	Four children and one adult died
V.1 Plei Ngol-Drong	Abdominal pain, diarrhea, vomiting, skin rash	Some people died two days after spraying; rash resembled chicken pox
VI. Kontum-Phu Yen Border	Abdominal pain, diarrhea after eating manioc harvested after spray, with inadequate cleaning	Illness only among those not following instructions given to agricultural engineer in Hanoi; no deaths

Most respondents reported widespread deaths among their domestic animals following the spraying, particularly chickens and pigs. Some respondents reported villagers found dead wild animals, particularly wild boars, in the forest after spraying. Responses concerning effects on aquatic life were more variable than those on humans or other animals. Dead fish seen floating in the stream near Long Djon (Location I.1) may have been due to herbicides or they may have been killed by the many soliders in the area who frequently threw grenades in the streams to kill fish. The Plie Ro-O respondent also reported a great many dead fish in streams following spraying. The fish appeared swollen, and villagers who ate them got diarrhea. Plei Ngol Drong (Location V.1) and Polei Krong respondents (Locations III.1 and III.2) reported similar effects in dead fish following spraying. The latter also noted the gills of some of the dead fish were blackened or reddish in color.

The respondents were consistent in reporting effects of herbicide on plants: over a period of weeks following the spray, plants wilted and died. Where the spray fell on swiddens, the crops died; where it drifted into gardens, the crops wilted. Rice which was not killed outright produced no grain. Fruit trees died, or failed to produce edible fruit. Some villagers reported eating parts of affected plants, after which they got diarrhea. Other decided not to eat any of the sprayed plants. The spraying was reported to have resulted in serious food shortages for the villagers and also for the NLF in some areas. Some villagers reported that big trees survived after losing all their leaves, others reported the big trees had died, and many had been cut for firewood.

Responses of the villagers concerning long-range effects in sprayed areas varied. The Hanoi-trained agricultural engineer reported he believed effects on people and on plants would be only temporary. He believed that one of the types of herbicides being used broke down in the soil and actually increased soil fertility. Some villagers felt they could plant again in the affected areas, but most apparently decided to relocate their fields into unsprayed areas. Some reported persistent effects they believed to be due to herbicides more than a year after the spraying.

(c) Summary and conclusions

The reports of serious deleterious consequences of herbicide spraying on humans, animals, and plants are internally consistent. At a minimum, they indicate an association in the minds of the Highlanders between the use of herbicides and harmful effects to themselves, their animals and plants, and their environment. Reports of human illness following spraying are so striking it is difficult to dismiss them as simply the effects of propaganda, high normal death rates, or faulty understanding of cause and effect.

Mr. SWARTZENDRUBER. A National Geographic article on the H'Mong published in 1974, nearly 2 years before the Pathet Lao came to power, mentioned H'Mong complaints that airplanes were spraying their opium fields making people sick and killing a number of children. At the time these incidents were blamed on the United States. As far as I know, these incidents remain mysteries.

The United States and the Lao Government denied knowledge of the opium spraying. Scientists said that the defoliants such as agent orange could not possibly have caused the symptoms claimed by the Montagnards in Vietnam. Yet, interviewers reported that the claims were credible and that the villagers had no reason to lie.

It is possible perhaps that some sort of opium spraying has been carried out in Laos and that such incidents have been blended into earlier accounts of attacks on H'Mong rebels around Phou Bia Mountain.

Having seen firsthand the enormous amount of debris left after the war in Laos, I have found it strange that no pieces of ordnance have been found in Laos or in Kampuchea indicating chemical warfare.

I personally found large numbers of rockets, including the 2.75-inch rockets that were mentioned in the previous testimony. Without very careful and systematic suveying and cross-checking of refugee reports to back up the fragmentary evidence provided by intelligence sources, I suspect we may never have a satisfactory explanation of what has been happening.

That is the end of my prepared statement.

Senator **Warner**. It is a very helpful and informative appraisal based on a series of journeys and visits that bespeak of your courage.

Would you take the opportunity to look through the report issued today and provide the committee with any further comments that you may have? I will be glad to give you this copy.

Mr. **Swartzendruber**. I was just given one coming in. I really haven't had a chance to look at it very closely.

Senator **Warner**. Would you be able to give us an assessment of this report based on your own personal experience and other evidence that you have gathered?

Mr. **Swartzendruber**. Well, I should say, first of all, that I have been one of those who have criticized the evidence that has been presented to date. At first glance, this appears to be a substantial improvement over what we have seen so far. As far as the actual intelligence, I haven't seen anything in skimming through here briefly which I had not heard before.

I might mention one thing which may or may not be significant. I was particularly intrigued by the story of the Pathet Lao pilot who is said to have defected with very specific accounts of his activities flying chemical attacks against the H'Mong, for two reasons.

The first being that my impression is that that person crossed into Thailand approximately 3 years ago I believe, and I recall specifically administration witnesses saying in 1979 and 1980 that they did not have defector accounts which they considered credible, which causes me to wonder whether this means that this was not available to them at the time or if they have reassessed the credibility of this person.

The second point was that in my own talking with people who had been pilots in the old regime, several of whom said they had been trained in the United States, for example, at Lackland Air Force Base, without exception they told me that their single greatest frustration was that they were not considered politically reliable and therefore were not given access to aircraft missions. Several of them were permitted to be on ground crews or had other roles in the military, but without exception they told me that they were not permitted to fly for the simple reason that the Government was afraid they would take the planes across to Thailand and defect with them.

So I am a little bit puzzled. There may be an explanation, but I am not aware of it at this point.

Senator **Warner**. Well, we thank you, sir.

Dr. Meselson, we are delighted to see that you have joined us today. You have submitted a prepared statement. Would you care to go over that before going to questions?

STATEMENT OF MATTHEW MESELSON, PROFESSOR OF BIOCHEMISTRY, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

Dr. MESELSON. Thank you, Mr. Chairman. It is a privilege to be invited to appear before the subcommittee in connection with its consideration of the administration's request to begin production of binary nerve gas weapons.

SOVIET CHEMICAL WARFARE CAPABILITIES AND INTENTIONS

Today there is concern about Soviet chemical warfare capabilities and intentions. We do not know whether the Soviets have or have not increased their stockpile of lethal chemical weapons over the last 12 years during which we have refrained from producing such weapons. Similarly, estimates of Soviet chemical weapons stocks are extremely variable and uncertain. There are no reliable estimates. It is prudence, not definite knowledge, which requires that we assume the existence of a substantial Soviet chemical threat. This assumption would be appropriate with or without the disturbing reports of the use of toxic weapons in Afghanistan and of possible Soviet involvement in their use in Southeast Asia. It does not in itself, however, provide a sound basis for deciding specific procurement issues.

M687

Because of the brief time, I will focus my presentation on the issue of whether to start production of the M687 155-mm binary GB nerve gas artillery projectile. As you know, the M687 is the only binary munition thus far certified ready for production. The other nerve gas weapon for which the administration has requested production funds in fiscal year 1983 is the Bigeye bomb. But since its developer, the Navy, now states that the need for further development will postpone the first possible production to fiscal year 1984 or beyond, it would seem wise to concentrate our present considerations on the M687 and deal with the Bigeye next year when the as yet incomplete DOD studies of its effectiveness and deliverability are farther along. In this connection and as general background I would like to submit for the record the sanitized version of a paper I prepared last year as a consultant for the Department of Defense, Manpower, Reserve Affairs, and Logistics. It is entitled "Comments on the Defense Science Board [DSB] Chemical Warfare Panel Report," and is dated January 8, 1981.

The points I would like to present regarding the M687 are as follows:

First, the already existing quantities of 155-mm and 8-inch GB and VX nerve gas artillery projectiles, namely the M121 and the M426 are more than ample for U.S. artillery requirements for 30 days of chemical warfare in Europe.

Let me explain. For causing casualties to well-trained, well-protected troops, as the Soviets certainly are, chemical artillery fire will generally be much less effective than conventional high explosive artillery fire. This is because a soldier wearing a modern gas mask and other protective gear is nearly invulnerable to chemical weapons, whereas no comparably effective protection is practicable against the effects of conventional artillery. By forcing troops into protective posture, however, chemicals will degrade mission performance and slow the tempo of enemy operations to an extent which is uncertain but may be substantial under certain conditions.

Since firing more chemical rounds means firing fewer conventional rounds, there will be an optimum ratio, depending upon the amount required to force the other side into protective posture. Firing more chemical rounds than this optimum will reduce, not increase, U.S. combat effectiveness. Thus, as stated in a recent DOD report to the Congress, the objective of U.S. retaliatory use of chemicals would generally not be to obtain casualties but rather to force the other side into protective posture. Avoiding additional casualties to unprotected civilians downwind is a further reason for not exceding the optimum.

Calculations based on munitions effectiveness data show that the inclusion of just a few percent chemical rounds in total artillery fire would provide opposing forces with a powerful incentive to assume a high degree of chemical protection. The number of chemical artillery rounds needed to comprise 5 percent of all rounds fired by the United States during 30 days of all-out war in Europe would be about 200,000. Essentially the same estimate can be reached by a different approach, namely, detailed target analysis.

It has been estimated from unclassified sources by Dr. Julian Robinson of Sussex University that the existing stockpile of M121 and M426 nerve gas artillery projectiles is substantially greater than this requirement.

It should not be forgotten that the United States maintains, in addition, a large number of 155-mm mustard rounds designated M110, which, although usually requiring higher ammunition expenditures, can, in situations in which it is desired to create a persistent vapor hazard to the lungs, eyes, and skin be superior to rounds containing the presently stockpiled nerve agents GB and VX. The Army is currently planning to upgrade the M110 stockpile, increasing the number of ready-to-issue rounds. In addition there are large stocks of 105-mm GB nerve gas artillery projectiles, the M360. Although the Army is phasing the 105-mm howitzer out of Europe, it will remain a standard artillery system for the Marine Corps. The current upgrading program also includes these 105-mm nerve gas munitions.

The second point I would like to emphasize is that stocks of serviceable M121 and M426 nerve gas artillery projectiles are not significantly deteriorating. Tests done several years ago were mistakenly interpreted to suggest deterioration of nerve agent in U.S. artillery munitions. The tests were later found to have been done incorrectly. Subsequent tests show no deterioration. On the basis of still more recent tests, the Army has assigned all lots of nerve agent in its 155-mm and 8-inch artillery projectiles to "Condition Code A," defined as "Serviceable—fully meets all military characteristics. Issuable without limit or restriction." The same holds true for all lots of mustard gas in M110 155-mm projectiles.

As of last summer only 33 of the very large number of stockpiled M121 and M426 projectiles were classified as leakers. The leaks are minuscule. They present no real hazard. In past years some of the stocks were not adequately maintained. Also, burster charges were not supplied for many of the rounds. Due to improved maintenance, burstering and inventory programs, the stockpile of serviceable munitions is now substantially increasing.

While it is true that some types of chemical munitions are deteriorating or obsolete, these do not include the M121 and the M426. Contrary to continuing misconceptions, even among high-level military and civilian officials, the serviceable stockpile of M121 and M426 projectiles is in excellent condition and with proper maintenance can remain so.

I have here a recent photograph of a small portion of our current stockpile of 155-mm nerve gas artillery shells at the Tooele Army Depot in Utah. One can get some idea from this of the excellent condition in which these rounds are kept.

Third, the M121 and the M426 nerve gas artillery projectiles are not obsolete nor are they becoming so. Contrary to prevalent misunderstanding, these rounds are fully compatible with currently deployed artillery weapons and can be fired to their full range.

The fourth point to consider is that the proposed binary projectile has not been adequately field tested. In contrast, the presently stockpiled U.S. nerve gas artillery projectiles have been extensively field tested.

Due to restrictions on field testing enacted by Congress, the M687 binary projectile has never been field tested in its actual configuration. In spite of extensive field tests with simulated agents, and a single test shot with a live round of a binary munition of significantly different design, field testing with live rounds in the present configuration has yet to be done.

In addition to revealing possible unsuspected design faults, field testing is needed in order to develop munitions effectiveness tables which presently do not exist for the M687 binary. Only such testing can provide fully dependable information as to whether the M687 is reliable and equal in effectiveness to the currently stockpiled M121 GB round.

In this regard the former Director of Development at the Army Chemical Systems Laboratory, Dr. Saul Hormatz, has stated that, and I quote:

> When I developed and introduced into production the presently stockpiled munitions I chose a straightforward approach and merely adapted and modified the designs of existing suitable munitions for which we had a very large number of static and then dynamic (field) trials. We had to make numerous design changes as these trials progressed and in some cases critically important changes they were. We would never have gone into production without all this engineering data, even on as simple an adaptation program as we could have devised. The proposed binary munitions are not a simple change from other rounds, but are an entirely new design. Their functioning will be entirely difference from their predecessors. Engineering data must be obtained on cloud size and shape, rate of formation, yield droplet size distribution persistency, et cetera, et cetera, statically and dynamically and in statistically significant numbers. These must be with live, not simulant rounds. This is a large program. A few tests just will not do.

My fifth conclusion is that presently stockpiled chemical artillery munitions can be safely stored and transported.

Binary chemical munitions are intrinsically less likely than single-fill munitions to cause unintended release of nerve agent until they are assembled, which would be done normally in or near the battlefield.

In considering the safety of existing chemical munitions, which are of the single-fill type, certain extremely improbable accidents, such as the crash in a populated area of a plane carrying nerve gas munitions may be envisaged. Even then, however, with their fuses packaged separately, the release of nerve agent from single-fill chemical artillery shells is very unlikely. Drop tests of the M121 from thousands of feet confirm this expectation.

The already stockpiled nerve gas artillery projectiles have a long and excellent safety record, as expected for their rugged and simple design. They have been and can continue to be stored and transported with a high degree of safety.

Finally, Mr. Chairman, is that production of the M687 risks undermining the NATO political balance on which European defense planning ultimately rests.

The Governments of Norway and Holland have recently stated that they would not allow their forces to use chemical weapons or permit chemical weapons deployment on their territory. The stated policy of the Federal Republic of Germany is not to train its troops in the use of chemicals now or in the future. There is no evidence that the FRG will permit replacement of U.S. chemical weapons already deployed there with binaries, let alone permit the deployment of increased quantities.

Indeed, there are recent indications that U.S. production of short-range nerve gas weapons such as the M687 which are perceived as being most likely to be used on German soil could force the Government of the Federal Republic to request withdrawal of U.S. stocks presently positioned on its territory. This would leave the United States with no stocks whatever in Europe for prompt retaliation in case of chemical attack.

Much of the opposition to chemical weapons in European NATO countries is based on awareness that even a few weeks of major chemical war on their territory could cause tens of millions of civilian casualties, a catastrophe of strategic proportions for Western Europe.

There is also concern that NATO emphasis on chemical weapons, as opposed to emphasis on chemical protective measures, may lead the Soviets to doubt NATO resolve to use nuclear weapons, on which the deterrence of war itself is felt ultimately to depend.

In conclusion I would say that there is no need for the M687 and that a decision to produce it at this time would waste defense resources and would jeopardize our present forward-based chemical retaliatory capability and would risk undermining NATO cohesion on even larger issues.

Thank you.

Senator **Warner**. Professor, have you had an opportunity to study why the Soviet Union has expressed an almost total unwillingness to come to the negotiating table and continue discussions in this area and perhaps reach a verifiable and balanced treaty in this area?

Dr. **Meselson**. Senator, it is the United States, not the Soviet Union, which has declined to resume the bilateral chemical weapons talks.

The problem with the Soviets is not that they won't sit down and talk. It is that they have not as yet agreed to the kind of systematic onsite inspection which the United States has sought, to insure that the declared stocks under any treaty agreement are actually destroyed. In August 1979, the United States and the Soviets did announce agreement on the principle of international onsite inspection by challenge. The Soviets have not made it clear to us, however, under what conditions such challenge inspections would actually be permitted.

The talks were started only in 1977. I see nothing to be lost by resuming them. I would hope that our Government will see fit to resume bilateral negotiations on chemical arms control in the near future.

Senator WARNER. You express, and accurately so far as I know, the reluctance of NATO to even go to the extreme, as you say, in some instances of training to defend against the use of such weapons. In view of the only substantial experience, the exception being what we heard today by the first panel, but the only experience is World War I right on the very soil which we are now defending today with NATO, why are they so reluctant?

Dr. MESELSON. There are two different issues here. One is preparedness to protect their forces against chemicals. The other issue is having a chemical retaliatory capability.

Senator WARNER. Also, in view of the fact that experiences in World War I, and I have read this history as you have, show that as soon as both sides began to have an equal competence and capability, the chemical warfare subsided, and in World War II it was never even initiated.

Dr. MESELSON. I believe that the major deterrent to chemical attack is a good protective posture. The European NATO allies, for example the British, the Dutch, the Belgians, the West Germans, and the French, train in protecting their troops against chemical attack. They have suits and masks, and other protective equipment and they train. In fact, one of the British Army chemical experts, C. N. Donnelly, in a recently published article states that the British Army is better trained and equipped to protect itself in a chemical atmosphere than is the Soviet Army.

However, neither the British nor any of the continental NATO allies have evidenced any interest in possessing nerve gas weapons except for the French who do possess them.

As to why the West Germans and certain other NATO allies do not seek any chemical retaliatory capability, I suspect that the reasons are the ones I mentioned earlier. From their point of view, and you almost have to imagine what it would be like to have a nerve gas war in a densely populated part of the United States, but from their point of view poison gas weapons pose an immense threat to their own populations without offering any commensurate military utility. To put it bluntly, Germans tend to feel that chemical weapons would kill only Germans. That may account in large part for their disinterest in relying on chemical retaliation.

In World War I, I believe it is fair to say that it was the effectiveness of the gas mask and other defenses which blunted the effect of chemical weapons and not retaliation. This view is supported by official U.S. studies, the official British history of the war, by Capt. Basil Liddel-Hart and other authorities. Because of defensive measures, gas was not a critical factor in World War I. The British official history states that "gas achieved but local success, nothing decisive; it made war more uncomfortable, to no purpose."

Senator NUNN. Didn't the wind switch some causing backlash on some of that?

Dr. MESELSON. Yes.

Senator NUNN. Wasn't that a prime factor in it not being used more?

Dr. MESELSON. Well, it was used a lot even with the wind blowing. But after defenses, even the crude defenses available in World War I, were put into use, the impact of chemical weapons was greatly blunted, to the extent of making their utility marginal.

Since the masks and other defenses have improved a very great deal since World War I and since the competitor weapons such as fragmentation and flame have also improved, the improvement in chemical weapons themselves has probably been more than offset. Therefore, if chemical weapons are ever used again in a European war, I expect that, except for the possible surprise of the first attack, they would be even less effective against military forces than they were in World War I.

Senator WARNER. Do you believe the Armed Forces of the United States are well trained and well protected when it comes to chemical warfare?

Dr. MESELSON. I wish I could say yes, Senator. We have pretty good equipment. We have a good protective suit. We could have a better one. We could have better gloves. The mask has been criticized much more than it ought to be, but we could have a better mask. I don't think the equipment is the weak point, however. I say that for broad reasons, namely, that in World War I the equipment was a disaster compared to what we have today, but with training it made the whole difference. Except for certain special units, such as the 82d Airborne and some units in Germany, training is not adequate. But training is improving.

Also, it seems to me difficult to argue that we can impress the Soviets with our chemical resolve by buying more chemicals if we aren't even willing to field test under controlled and safe peacetime conditions a number of chemical rounds.

Senator WARNER. Well, Doctor, your testimony has been very helpful.

Do you have questions, Senator Nunn?

Senator NUNN. Just one question, Doctor.

Can you imagine having a verifiable and enforceable treaty with the Soviet Union on chemicals without onsite inspection?

Dr. MESELSON. No; I can't. But I think there are some ways in which onsite inspection can be made minimally intrusive. An example is the idea of separating the problem of inspecting what is declared from what is not. The Soviets really ought not to have much objection to letting us verify the destruction of stocks they themselves declare.

As for production facilities, if they are declared, we can see from satellites if they are destroyed. We may need some inspections to make sure that it is what they really were, but if they are declared

I would think that we are on sound ground to argue that we should be able to make some of those visits.

Now you get into the problem that after everything that is declared is gone, and that might take 10 or 15 years, what do you do about suspicious events or suspicious sites afterward, in the post-destruction environment? There you need to have some sort of challenge onsite inspection as already agreed to in principle. The negotiating position the United States had beginning in the summer of 1977 and which was devised essentially by the Joint Chiefs seems to me a good one. As you would have with any negotiating position, there are some ways in which we might make certain adjustments or concessions if there was evidence of getting motion on the other side. But unless the United States agrees to resume the talks, we risk losing whatever such prospect there may be.

I would hope that we haven't retreated from our 1977 position. I worry, I must say, that if we are not going to be talking to the Soviets about this, that even if there were a possibility of an agreement, that we put ourselves in a position where we are not going to be able to achieve it.

I don't see anything to be lost from talking. I think we should resume the talks. In the context of those talks we could also bring up, I would think, the compliance issues which are important and need to be discussed with them.

Senator NUNN. Thank you very much.

Senator WARNER. Thank you very much, Doctor, we appreciate your coming and participating in this panel. You exhibit a great deal of knowledge on the subject.

[Dr. Meselson's comments on the DSB Chemical Warfare Panel Report follow:]

COMMENTS ON THE DEFENSE SCIENCE BOARD [DSB] CHEMICAL WARFARE PANEL REPORT BY M. MESELSON, DEPARTMENT OF BIOCHEMISTRY AND MOLECULAR BIOLOGY, HARVARD UNIVERSITY, CAMBRIDGE, MASS.

I. DISCUSSION

Specific comments on the DSB panel report are organized below under several headings:

1. Soviet threat.
2. War in a chemical environment and anti-chemical protection.
3. U.S. chemical weapons, stockpile and requirements.
4. Binary chemical weapons.
5. Civilian casualties.
6. Future trends.

1. *Soviet Threat.*—[Deleted.] We know a considerable amount about Soviet anti-chemical protective posture. It is pervasive and well exercised. This, however, provides no measure of Soviet offensive chemical preparations. A strong defense is to be expected in view of their WWI experience and the large U.S. chemical weapons buildup of the '50s and '60s, coupled with the fact that we were not then parties to the 1925 Geneva Protocol and had officially refused Congressional requests to reaffirm our WWII policy of no-first-use. [Deleted.] The panel's own report, however, in some sections perpetuates worst-case interpretations, the basis for which is highly questionable. The trouble with this is that it tends to obscure the questions, when awareness of them could be important in policy formation and in intelligence efforts. Prudence, not definite knowledge, dictates that we assume the existence of a substantial Soviet chemical threat.

2. *War in a Chemical Environment and Anti-Chemical Protection.*—The DSB panel report recommends major expansion of currently planned defensive and retaliatory chemical programs at a five-year cost estimated by the panel to be three or

more times the $3.47B projected for current programs. However, the panel report provides almost no data and analyses on the basis of which its recommendations can be evaluated in competition with other options for utilizing defense resources. Moreover, the panel report reflects unfamiliarity with available data on matters of critical importance to its recommendations regarding defensive and offensive chemical programs.

For example, in order to illustrate the potency of nerve agents the panel states that "A drop the size of a pinhead can cause death in [deleted]. "Appearing by itself, this statement suggests a serious overestimate of the percutaneous threat of nerve agents, particularly in the case of the U.S. persistent nerve agent VX. While it is correct that the lethal dose of VX is about a pinhead's worth, this refers to the dose actually absorbed into the body. It is the amount estimated to be lethal if injected directly into the bloodstream. If applied to average skin or clothing, the amount of VX required to kill or incapacitate and the times required are very much greater, as shown below:

ESTIMATED EXPOSURES AND TIMES TO INCAPACITATION FOR AGENT VX

	Amount (mg)	Time to incapacitation
In the body	[1] 0.6	
Applied to average skin	10	
	200	[Deleted.]
Applied to U.S. Army summer uniform	100	

[1] "Pinhead."

Even troops in considerably less than full protective posture can be directly exposed to VX artillery fire without necessarily suffering heavy casualties. For example, field manuals state that a battery volley of airburst 155-mm VX (6 projectiles) on a platoon size target (100 meter radius, receiving [deleted] in open terrain or open foxholes would cause [deleted] casualties among troops wearing masks, hoods, gloves, and the equivalent of ordinary U.S. Army winter uniforms but no protective suits. Four volleys are estimated to [deleted] casualties, with [deleted] expected to develop within [deleted] after the attack. Substantial casualty prevention can be achieved by decontaminating or changing clothing or decontaminating skin even [deleted] or more after exposure (although the sooner the better). Furthermore, the self-administered antidote carried by Pact forces is particularly effective against VX poisoning, because of the prolonged period during which the enzyme-VX reaction can be reversed by oximes. Moreover, if troops are not directly exposed but instead are protected by a barrier against liquid spray, they would face only the lesser threat of indirect pickup of VX from contaminated surfaces. Limited exposure can be risked because casualties are delayed and can be averted by decontamination and antidotes. Protective suits are standard issue on both sides and will be worn if chemical war occurs. But VX may not often make it necessary to button-up fully. If only the highest levels of protective posture impose substantial performance degradation, the utility of VX against Pact forces on the battlefield and in rear areas may be marginal. These considerations call into question the DSB panel recommendation for production of ground and air-delivered VX weapons.

It should be noted that neither VX nor GB present much of a percutaneous vapor hazard under average field conditions. Mustard, the WWI "king of gases", does present such a hazard and may therefore in some circumstances be competitive with nerve agents. It is, therefore, of interest that in WWI, the only case of large-scale chemical warfare, German artillery fired approximately 9000 agent-tons of mustard over a period of 14 months in 1917–18 when the Allies had nearly intolerable gas masks, little or no protective clothing and no agent nearly so effective as mustard with which to retaliate. Gas, however, was not a decisive weapon in WWI, due to the availability of primitive but sufficiently effective protective equipment and tactics. Of course, today's conditions are different. On the one hand, the nerve agents are more toxic than WWI agents and delivery rates are higher. On the other hand, today's protective equipment is superior and non-chemical competitor wapons, such as improved conventional munitions, have greater effectiveness than did the HE munitions of WWI. The use and effects of gas in WWI should be studied. While that conflict may not provide definitive answers to day's questions, it can provide a useful guide for analysis and it raises important questions that may otherwise be overlooked. A careful study is that of D. K. Clark done under contract with the Department of the Army; "Effectiveness of Chemical Weapons in WWI," Operations Research Office Staff Paper, ORO-SP-33, November, 1959.

Another case in which the DSB panel seriously overestimates the impact of chemicals occurs in their statement that "Existing (U.S.) suites are designed to a six-hour specification, but persistent agents remain effective for longer than individuals can remain encapsulated in protective clothing." In fact, the suit is much better than the design requirement. Under continuously contaminated battlefield conditions simulated by the specification test, the suit is good for more than 70 hours.

The DSB panel may also be unduly pessimistic regarding the operational degradation imposed by the U.S. protective ensemble, given by the panel as 30 to 50 percent. These percentages are approximately equal to the amount of rest time in currently recommended work/rest cycles chosen to minimize heat stress among men doing heavy work in protective gear (MOPP-3) in warm (70–85° F, wet bulb) to hot (85–100° F) weather. In central Germany, the mean early afternoon temperature for July and August is about 60° F, with a standard deviation of ±5 F. The recomended rest time percentages do not tell us the actual impact on combat performance. For example, for combat activities characterized by alternating periods of high and low work rate, the work/rest cycle requirement may in many cases be accommodated with little degradation. Also, it must be remembered that the Army has a graded system of four levels of protective posture from which commanders select in accordance with the situation. Typically, only a fraction of the units will be in full protective posture at any one time. This discussion is not meant to imply that the current U.S. individual protective ensenble is fully satisfactory. It is not, although further improvements can be expected. The DSB panel, however, appears to have operated under an exaggerated impression of its shortcomings.

3. *U.S. Chemical Weapons, Stockpile and Requirements.*—There are approximately [deleted] serviceable or soon to be made serviceable 155-mm and 8-inch nerve agent projectiles in the U.S. stockpile. [Deleted] of these are deployed in Europe. We need to know how these numbers compare with requirements in a chemical war. For causing casualties among well trained troops wearing good protective gear, chemicals will generally be much less effective round-for-round than other kinds of shells, such as improved conventional munitions. Wearing masks and chemical protective garments, however, degrades mission performance to a degree that depends on the protective equipment, the level of training, the nature of the mission and the temperature. Firing more chemical rounds means firing that many fewer HE rounds. If the objective of chemical retaliation is to force active enemy units into a high degree of protective posture, there will be an optimal mix at or below the proportion of chemical rounds needed to do so. Under conditions when the degradation imposed by protective posture is particulrly low, the optimum tradeoff may be close to firing no chemicals at all. Firing a higher proportion of chemicals than the optimum will actually reduce our combat effectiveness.

Our present stocks of 155-mm and 8-inch nerve agent artillery projectiles could provide U.S. forces with a mix of [deleted] chemical artillery ammunition for a [deleted] full-scale war in Europe, or [deleted] if 155-mm mustard rounds are included. This assumes an overall [deleted] expenditure, chemical and HE, of about [deleted]. Although the U.S. does not maintain 105-mm artillery in Europe, other NATO forces do, and could therefore utilize additional U.S. stocks of 105-mm GB and mustard projectiles, amounting to [deleted] rounds.

I know of no reason to consider that existing U.S. stocks of nerve agent and mustard artillery ammunition are significantly deteriorating or becoming obsolete. Fewer than [deleted] is classified as a "leaker" and the leaks are generally miniscule, presenting no great hazard. The nerve agent itself should be stable indefinitely if there are no defects through which moisture may enter. Tests on agent drawn from munitions confirm this expectation. The 155-mm and 8-inch shells are compatible with currently deployed artillery tubes and can be fired to their full range. Unless existing U.S. stocks are quantitatively inadequate, there is no pressing need to produce additional chemical artillery projectiles.

4. *Binary Chemical Weapons.*—If further analysis suggests that it is necessary to produce additional nerve gas artillery munitions, it may be questioned whether binaries of current design or single-fill munitions are the better choice. Binaries are intrinsically less likely to cause unintended release of nerve agent. But the safety argument has often been exaggerated. Single-fill projectiles can be stored and shipped without fuzes or even bursters inserted, precluding detonation. In the more than twenty-five years that the Army has had nerve agent weapons, there has been

no serious accident. Certain accidents such as the crash of a plane carrying single-fill artillery projectiles could conceivably release considerable amounts of nerve agent. Such risks should be considered analytically to reach some rational basis for estimating their likelihood and severity. If a suitable batch incineration method of demilitarization is available by the end of this century, as seems likely, the demilitarization benefits now seen for binaries could largely disappear. The greater ease of manufacturing binaries is not an impressive advantage in our advanced industrial economy. Nor is it something we wish to advertise to less advanced nations for whom nerve agent weapons might seem more attractive if their production were more readily accomplished.

Regarding military performance, there are several questions concerning artillery munitions that deserve further examination than that given by the DSB study:

Sound. With their much smaller burster charge and thinner casing, currently designed binary rounds likely make a sound when they burst which is distinctively lighter than that of conventional HE fragmentation rounds. This could provide target personnel with prompt warning of gas attack. In WWI, this situation existed with early German mustard shells. Allied troops are reported to have been distressed when these munitions were superseded by mustard shells with heavier casings and larger bursters, the sound of which could not be distinguished from fragementation shells.

Odor. Odorlessness is cited as a useful property of the nerve agent in single-fill munitions. Because of incomplete mix or biproducts, does the mixture released by binaries of various current designs present a distinctive odor that might serve as a warning to unmasked target personnel?

Temperature dependence. Temperature effects on viscosity and on chemical reaction rates will influence the time course of the binary reaction. Over what temperature range can currently designed binarymunitions be used without adverse effects on their performance?

Range limitations. Early in its flight, the binary projectile contains little nerve agent. As the binary chemical reaction proceeds, the amount of agent builds up. In the case of VX, however the amount of agent may reach a maximum and then decrease, due to thermal decomposition. What performance reductions, if any, are imposed at short and long range by these effects?

Complexity. Binaries are intrinsically more complex in having several parts that must be properly assembled on the battlefield. What difficulties may arise from this feature?

The first air-delivered chemical weapon for which a production decision will be needed will probably be the Bigeye binary VX bomb, still in engineering development. There are three questions specifically concerning the Bigeye which I would suggest for consideration:

Deliverability. Bigeye was designed in the early 1960's. The Soviet air defense it would face will be very different from what may have been envisaged then. Recent discussions of air-delivered chemical weapons place emphasis on the attack of certain fixed targets in Pact territory far behind the front. What penetration and return probabilities can be estimated for Bigeye delivery to such targets in the decade or two ahead?

Agent. Is VX a sufficiently effective agent, taking into account the possibilities for casualty avoidance, non-disruptive decontamination, and antidote therapy discussed above in section 2?

Deposition density. If the VX air-delivered bomb is required, is the individual low deposition density [deleted] of Bigeye adequate? This is [deleted] the design density for the TMU-28 spray tank or the density achieved even in the single-volley artillery attack envisaged in section 2.

5. *Civilian Casualties.*—There is agreement within NATO on the need for adequate chemical defense. Some NATO countries have given the matter considerable attention for many years. But there is wide policy divergence regarding chemical retaliatory capability. The stated policy of the FRG is not to train its troops in the use of chemicals "now in the future" and there is little indication that the FRG will permit any expansion of the U.S. chemical weapons stocks now there. Judging from writings of German defense planners and statements of senior German officials, much of this reluctance stems from fear of civilian casualties, a subject not discussed in the DSB panel report.

Estimates suggest that a 30-day chemical war in Europe could kill millions of noncombatants while killing far fewer soldiers. Nerve agent poisoning is essentially cumulative over a period of days or weeks so that sub-lethal doses received at different times over that period can combine to become lethal. This cumulativeness also means that along-wind dilution of nerve agent clouds does not reduce the threat posed to persons down-wind. The subject of civilian casualties is of high importance, both because of the lives at risk and because unless European perceptions change, additional forward deployment and joint retaliatory use of U.S. chemical weapons may be impossible.

6. *Future Trends.*—We should ask whether chemicals are likely to be of increasing or declining importance over the next two decades. The last twenty years have seen a major increase in the effectiveness of HE anti-personnel weapons. During the rest of this century, the main development in conventional arms is likely to be the large-scale introduction of precision-guided weapons. Both of these trends act to make chemicals less competitive for many missions. For example, chemicals will probably become less attractive for suppressing sortie rates of air bases as precision-guided weapons able to wreck the runways become available. Greater effectiveness and much-reduced areas of unintended casualty production will favor the precise weapons in such cases. Seeing the choice, Europeans are likely to be more reluctant than ever to see chemicals integrated into NATO defense. Also, chemical protection is sure to improve substantially. Even without any break-throughs in the development of effective antidotes, steady progress in the design of masks, suits, and detectors will substantially improve the defense. Major offensive improvements seem less likely, but need to be considered and watched for. Overall, it seems probably that chemicals will be of declining importance. Still, there may well be missions for which this isn't so. What is needed, and does not appear to have been done, is a mission-by-mission analysis of the pros and cons of chemicals, done for the present situation and also projected ahead.

II. SUMMARY

1. The principal conclusions of this review of the DSB panel report are that:

It rightly emphasizes the need for:

[Deleted.]

New, mission-oriented estimates of chemical weapons requirements.

Stepped-up field exercises to evaluate combat performance on the chemical battlefield.

Studies of low cost demilitarization methods.

It presents data which over-estimate the military impact of chemical weapons against forces with anti-chemical protection.

It does not appear to have considered the shortcomings of the U.S. persistent agent VX.

It over-states the disadvantage of existing single-fill chemical munitions and does not appear to have examined possible limitations of binary weapons of current design.

It does not discuss the possibility and implications of very high levels of civilian casualties from chemical war in Europe.

2. These conclusions lead me to the following differences on major, near-term policy issues:

Issue	DSB panel	Comments
Bigeye	Accelerate Bigeye VX programs to produce concurrently or ahead of 155mm binary artillery munitions.	Defer Bigeye production. Review military requirement for specific missions. May have low deliverability and inadequate target effects.
Binary artillery munitions	Produce	No pressing need for new production of artillery munitions. Maintain and upgrade existing stockpile.

Senator **Warner**. We will now proceed to the final panel consisting of Dr. John M. Deutch, dean of science, Massachusetts Institute of Technology and Dr. John Baldeschwieler, professor of chemistry, Cal Tech, California.

Dr. Deutch, we welcome you. You may proceed.

STATEMENT OF JOHN M. DEUTCH, DEAN OF SCIENCE, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE, MASS.

Dr. **Deutch**. Thank you very much, Mr. Chairman.

Let me make my remarks brief. I know you have had a long day here and it will give us an opportunity to discuss some of these very important and complicated issues.

Senator WARNER. That is all right. We have been at it all day, that is for sure, but this is an important subject and you take all the time you feel you need.

Dr. DEUTCH. Thank you, Mr. Chairman.

I am a professor of chemistry at the Massachusetts Institute of Technology and dean of science. I am also a member of the Defense Science Board and have been so since 1975.

During the summer of 1980 I was requested to chair a study of the Defense Science Board concerning all aspects of chemical warfare and the complex issue that this very difficult subject presents to us.

That study covered a great variety of subjects. Let me mention them to you because I believe that it is important to keep in mind the range of subjects that are of importance in chemical warfare.

First and foremost, the nature of the chemical warfare threat that we and our allies face.

Second, intelligence issues concerning events which take place by our adversaries in the area of chemical warfare.

Third, a wide range of policy considerations, including arms control questions and questions having to do with the proliferation of chemical weapons capability to other nations.

Fourth, the needs for improving our defensive posture in chemical warfare, both in the United States and within the NATO allies.

Fifth, the requirements that we have for improving our offensive chemical warfare capability.

Sixth, research and development needs both in short-term and long-term technology bearing primarily on defensive protection.

Finally, the very important issue of demilitarizing our old stocks of chemical agents, both in the United States, Johnson Island, and in Europe which are no longer of importance to us.

We made a wide range of recommendations to the then-Secretary of Defense which I believe have had an impact on the Department of Defense in examining their chemical warfare policy and programs.

Today I am here to give you some of my personal views on these matters. I am not representing the Defense Science Board, the Department of Defense, or MIT.

Let me begin by stating that I believe chemical warfare is abhorrent. Our problem is to assure that it will not be used in the future. Therefore, the principal issue that we face is how to adopt policies and supporting programs that would lead to deterrence to chemical weapons use.

Now chemical weapons can be used for two reasons.

First, as in the case of Afghanistan and Southeast Asia, to strike terror in unsophisticated military units or in an undefended civilian population.

However, chemical weapons can also be used against a sophisticated military adversary in order to cause him to suit up, to don protective equipment, to put on the paraphernalia needed to defend oneself against contact with nerve agents.

This process of suiting up significantly reduces, in my judgment, military force effectiveness despite the presence of adequate training and despite the presence of the best available defensive protection equipment both for units and for individuals.

Let me remind you that in NATO, of course, such training and such defensive protection is in fact neither available nor presently programed for most of the NATO countries.

Therefore, given the fact that we do not have the capability and, indeed, in principle it is not possible to deter CW use on the basis of defensive protective measures alone, we face the question of how do we deter Soviet chemical weapons use.

There are those who might argue that we should rely on nuclear weapons. I would consider such a course of action neither credible nor wise. There are others who would say that we should improve our conventional force posture in Europe in order to offset whatever decrement we might suffer from having to suit up in the face of a chemical weapons attack. I wish that that were possible to do, but I am not sure that that is a realistic proposal at this present time given the balance of forces in Europe.

Let me just point out to you that it is my judgment that Soviet capability is improving in the area of chemical weapons and their doctrine does call for its use. There are gaps, important gaps, in our knowledge about Soviet doctrine and capability. Nevertheless, the evidence is quite overwhelming in their capability and their intent to use CW in a NATO war.

In contrast, the United States and NATO capability for CW conflict is weak and declining. We have no adequate exercise program or doctrine for fighting chemical warfare. We do not have a reasonable mix of CW weapons which can be used to threaten the Soviet Union with suiting up, just as we are threatened at the present time. We have inadequate provision for defensive protection equipment and training and its use.

Let me turn next to arms control very briefly, Mr. Chairman. I regard the prospects as extremely dim. Let me just make two remarks about that. It would require, in my judgment, extensive onsite verification. The verification issues, however, would still remain formidable, and at the present time I regard them as insurmountable.

Moreover, we have progressive amounts of evidence that I am sure you have heard about here today of Soviet misconduct in the area of chemical weapons and biological warfare which I think must influence our views toward the possibility of such arms control negotiations.

I conclude, Mr. Chairman, that our allied capability is very weak and that it is an invitation for further Soviet adventures into chemical warfare. Our principal objective must be to deter Soviet chemical weapons use. The best way I see of doing that is first and foremost to improve our defensive posture, but this will not be enough by itself. We must strengthen our retaliatory capability by building some chemical warfare agents that are credibly deployed as weapons systems, especially those which reach toward higher value, deeper range targets. Thus, in my view, chemical warfare capability must accompany improvement in defensive posture.

Once one recognizes the need for an improvement in our chemical warfare weapons capability, it seems to me that binary chemical weapons are the choice. This is primarily for the reasons of safety, their transportation, their deployment, and from the demilitarization point of view.

Chemical warfare is a problem that NATO can solve. It is not an easy problem, it is not a pleasant problem, but I do hope that this Nation takes the leadership in company with our allies to address these important and complex questions.

Thank you very much, Mr. Chairman.

Senator **Warner**. Thank you very much.

We would like to hear from the other panelist before we proceed to questions.

Dr. Baldeschwieler.

STATEMENT OF JOHN BALDESCHWIELER, PROFESSOR OF CHEMISTRY, CALIFORNIA TECH, PASADENA, CALIF.

Dr. **Baldeschwieler**. My name is John Baldeschwieler. I am professor of chemistry at Cal Tech in Pasadena, Calif.

My background and experience are outlined in an attached CV to the prepared comments that I have today. Although I was quite familar with chemical warfare programs and issues during my service on the President's Science Advisory Committee from 1969 through 1971 and as Deputy Director of the Office of Science and Technology from 1971 to 1973, I have not been directly involved in this area since 1973. So I am here today to give you some of my personal views only.

In the early 1970's it was evident that the Soviets had devoted major efforts to both offensive and defense aspects of chemical warfare. Although there was considerable uncertainty as to the exact magnitude of the Soviet stockpile of chemical munitions, the capacity of their production facilities, and the size of their research and development effort, it was clear that these activities were large and were an integral part of Soviet offensive doctrine.

Soviet activities in the defensive areas were understood in greater quantitative detail and involved, for example, fundamental design practices for combat ships and armored vehicles to provide positive control of ventilation and filtering systems to allow continuing operations in contaminated environments.

Soviet defensive practices also involved widespread issue of decontamination systems, masks, protective clothing, and individual antidote kits as standard items of equipment. Operations with this equipment were frequently exercised. The Soviet force structure in 1973 was configured for a significant offensive and defensive chemical war fighting capability.

In contrast, the U.S. stockpile of chemical munitions in 1973 was small compared with estimates of the Soviet inventory. Much of the U.S. reserves consisted of obsolete munitions such as chemical land mines and agents such as mustard or phosgene. Production of agents has ceased, production facilities had been decommissioned, and it was estimated that 18 to 24 months would be required to resume agent production.

Under strong public pressure, complex efforts were underway to deactivate older munitions safely and to assure the safe storage and stability of the remaining agent stocks. Although R. & D. efforts were continued, resources were limited and there were few career incentives for either military or civilian research personnel in the chemical warfare area.

The U.S. defensive capability was also nominal. For example, naval vessels offered personnel no protection at all from chemical attack and the cost of reconfiguration of existing ships to provide this capability appeared to be prohibitive.

Furthermore, there was no consensus on providing chemical protection for newly designed vessels. Aircraft, airfields, and Air Force personnel were also completely exposed. Even the most rudimentary detection and decontamination facilities were not available at Air Force facilities and there did not appear to be procedures to deal with the possibility of Soviet chemical attack, for example, on critical airfields in Western Europe.

Chemical defense capability in the Army was better, although still marginal. Although there appeared to be adequate numbers of gas masks for Army combat personnel and some detection equipment for standard agents, decontamination equipment to deal with a large-scale attack was not available and an exercise with full protective gear was rare.

In 1973 the United States did not have a chemical war fighting capability in my opinion and was relying on the structure of international agreements, the possibility of a retaliation inkind doctrine, and the use of tactical nuclear weapons in response to a large-scale chemical attack. It was not clear at that time whether the United States even had the capability to deal with the wide variety of small-scale, less sophisticated uses of highly toxic chemicals that you and I can both imagine.

It is my impression that since 1973 the situation has changed in several significant aspects. U.S. capability may have decayed further and it is not clear to me that we can even retaliate inkind.

Furthermore, there appears to be strong evidence that chemical weapons have been employed in a number of conflicts with the possibility of Soviet complicity, support, or direct involvement.

In my opinion, the United States is dangerously exposed in the chemical warfare area. The evidence has suggested that the structure of international agreements alone has not provided an effective deterrent to the use of chemical weapons. I do not believe the United States currently has the capability to retaliate inkind, nor do I believe that the threat of escalation to tactical nuclear weapons is credible in many conflict scenarios or even a major conflict in central Europe.

Unfortunately, I do not see a responsible alternative to investing additional Federal resources in building a more viable chemical war fighting capability. I believe that the binary munition technology provides a basis for rebuilding U.S. defensive capability with acceptable safety and reliability.

However major investment must also be made in defensive equipment, detection and warning technology, protective clothing, decontamination systems, and medical protective measures for personnel to provide all of the military services with some capability to operate in toxic environments and these capabilities must be regularly exercised.

Chemical warfare is an area that is particularly susceptible to technical surprise. There are countless natural products or chemical substances which can be synthesized with prompt or delayed toxic effects which might be appropriate for chemical warfare use. These substances can be synthesized and tested on a small scale in many types of facilities so that the nature and intent of the activity would be easy to conceal.

For example, I believe that even a much larger chemical warfare program in the 1970's would not have allowed us to anticipate the emergence of the fungal mycotoxins as chemical weapons. Therefore, a very responsive U.S. chemical warfare research and development capability is an essential part of an adequate response to the chemical threat.

The elements of an adequate R. &. D. program must include high-quality, in-house research and a sufficiently broad and experienced contractor base to provide, for example, specialized analytical methods for the identification and characterization of new agents, sometimes a very difficult task, indeed.

The R. & D. organization must also have the intellectual and physical resources to respond quickly to new threats with detection techniques, protective clothing, antidotes, medical protective measures, and decontamination techniques.

The events of the last decade convince me that chemical warfare is an element of continuing importance in military technology. The United States is dangerously exposed in this area. In spite of historic public aversion to chemical warfare activities by the U.S. military services, I believe that responsible provisions for U.S. national security by the legislative and the executive branches must include a credible offensive and defensive chemical capability.

Thank you.

Senator WARNER. Thank you very much.

Would either of you care to comment on the testimony received from the first panel offered by Secretary Burt of the Department of State about the alleged use of these CW weapons by the Soviet Union and its allies in the described places?

Dr. Deutch?

Dr. DEUTCH. I have not read Secretary Burt's statement. I was not here this morning. I am familiar with a good deal of the evidence on which I believe the report that was presented today is based. I can just give you my personal judgment as a technical person, and that, at least in the case of Southeast Asia, the overwhelming weight of the evidence is that there has been use of these toxins and the implication of the Soviets in that use is very heavy, indeed.

In general I believe that the picture of Soviet misconduct in this area in Southeast Asia is very strong from a variety of different sources.

Senator WARNER. Dr. Baldeschwieler?

Dr. BALDESCHWIELER. I would concur. I also have not had a chance to read the report in detail, but I have had access to some parts of the evidence previous to today, in particular to some of the detailed chemical analytical methodology. It is my impression that the work is well done and the evidence is solid.

Senator **Warner**. Dr. Deutch, the Science Board found that development of the Bigeye bomb might ease the allied deployment problem. What were the reasons for that?

Dr. **Deutch**. Let me, first of all, say that the Defense Science Board did not consider specific questions of the deployment of weapons. Rather, I believe that the preference for the Bigeye bomb, or indeed I should say an increased emphasis on it relative to artillery shells, was that it had the capability to reach further back to more high-value targets and therefore was a more appropriate weapon for deterrent purposes.

In addition, the Bigeye bomb, given the fact that it can be put on carriers with longer range, would have a wider diversity of basing both at sea and on land.

In sum, we did wish to increase emphasis on the Bigeye bomb relative to artillery shells.

Senator **Warner**. The debate that will ensue in the Senate on this issue will discuss at some length the desirability to go simply with increased investments in defensive equipment. Of course, all of the weapons are for deterrent uses, nevertheless, it will be argued that we should place more emphasis on training with protective equipment versus putting in our inventory the binary system.

Would both of you gentlemen comment on that area.

Dr. Deutch, why don't you lead off.

Dr. **Deutch**. Mr. Chairman, let me say that the increased emphasis on defensive protection is absolutely correct. It is necessary but, in my judgment, not sufficient to deal with this problem. I do think that it is very important for this committee and other pertinent authorities to appreciate the loss in military effectiveness that occurs from just having defensive protection, even assuming adequate warning to don equipment and assuming extensive training.

In my view, defensive protection is not sufficient by itself to deter the use from an adversary who will not face the same risk of having to suit up. I do not believe it to be an adequate response to the threat we face today.

Dr. **Baldeschwieler**. Again, I would concur. Defense is clearly a central issue to a chemical warfare fighting capability.

I would like to point out in addition that defense is a very difficult business. One can defend to some measure against the agents and means of delivery and vehicles in which the agents are delivered with present capability. But this is an area which is extremely vulnerable to surprise. It is clear that one can devise agents and methods of employment that would defeat many of the defensive measures that one might invest in.

So it seems to me that it is essential to have a balanced offensive and defense program. Having a real offensive capability imposes on the opposition a logistic and operational burden that is equivalent to the one that we bear by taking responsible defensive measures. So it seems to me that a credible posture involves both an offensive and defensive capability.

Senator **Warner**. We thank both of you for your very valuable contribution to this issue. I find the testimony most helpful in meeting our responsibility to be persuasive and credible on the floor of the Senate.

Thank you very much.

The subcommittee concludes the hearings.

[Whereupon, at 4:30 p.m., the subcommittee adjourned.]

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